ELECTRICAL REVIEW

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Home Accidents

NEED TO VIEW ELECTRICAL MISHAPS IN TRUE PERSPECTIVE

IT is a melancholy thought that nearly all accidents which may in some way or another be classed as electrical result from thoughtlessness. In very many cases their cause is ignorance rather than carelessness, which word implies disregard of some foreknowledge.

The second précis, this time covering a whole year, which Mr. H. W. Swann has prepared of fatalities attributable to and following from the use of electricity in the home, which is referred to on another page, is an index to circumstances of use and perhaps points of design about which more care still needs to be exercised. When studying compilations of this kind, however, it is well to remember that all statistics have two meanings. In this case they do indicate the annual accident rate, but they also prove that the number of mishaps is very small indeed in proportion to the amount of electricity consumed and/or the number of people who make use of it daily in the home. One has little doubt which of these interpretations is the better.

Not Strictly Electrical

These figures will look quite different if viewed alongside the total of all accidents of every kind that occur on domestic premises. Then, too, not a few of them, if strictly classified, would not be listed as electrical at all. Burns, for instance, can be suffered with equal facility under similar circumstances whatever the heating medium may be. Owners of electric fires are not thought to be any more careless than users of gas and coal fires, but statistics relating to the latter are not circulated in the same way. Incidentally, a fair proportion of so-called "installation" accidents have likewise little to do with the circuit wiring as such. It is the terminating devices or end-accessories that usually have to be watched; indeed, the wonder is that more incidents do not occur, considering the mass of portable equipment requiring flexible connectors, household appliances as well as tools, which is in constant service.

Problem of Prevention

The great majority of accidents, electrical and otherwise, domestic and industrial, are usually preventable—but only by the effort of the individual sufferer in refraining from taking risks. The doings and misdoings of the ordinary individual in the privacy of his home are very different from the organized activities of factory workers. No sure safeguards can be devised to prevent domestic mishaps, while in campaigning of any sort it is very difficult to avoid over-emphasis of the danger aspect, which nobody wants to stress.

We do not, therefore, quite see what good cause may be served by the circulation of domestic accident statistics. Such records are, no doubt, useful departmentally, but we are not alone in thinking they are not one of the best ways of helping to educate the public.

That is, unfortunately, a very slow process, but patient perseverance is seldom unrewarded. By making use of

every proper opportunity of encouraging electrical housecraft advisers to instruct in the home, lecture in schools and colleges, assist specialist tuition at domestic science centres and by setting an example in other appropriate ways, we shall, with faith, continue to believe that precept is the best teacher of good conduct.

SIX MONTHS' OUTPUT

VARIOUS factors affect the demand for electricity and it is not possible to draw precise assumptions from the output figures issued by the Ministry of Fuel and Power. There is nothing to show, however, that the withdrawal of the restrictions on shop-window and display lighting last April has had any marked influence. In fact, the rise in electricity generated in the second quarter of the year—3.9 per cent— was below the average, though in this the weather was no doubt the major factor. During the first half of the year the total quantity of electricity generated was 23,345 million kWh, an increase of 5.7 per cent compared with the first six months of 1948. A point of note in the June returns is the lower output from water power (19 per cent reduction).

OBSOLESCENT PLANT

IN the British power system, out of a total generating capacity of something over 10,000 MW about 800 MW of plant is over twenty-five years old, although probably 100 MW of this is stand-by plant not in regular service. This is not to be wondered at, considering our circumstances, but it is surprising to learn from the *Electrical World* (New York) that 30 per cent of the utility steam generating capacity now operating in the United States was in service before the end of 1925. Even more surprising, perhaps, is the statement that practically half the generating capacity is twenty or more years old.

ELECTRIC RAILWAY SYSTEMS

A committee set up by the Transport Commission has for several months been considering which system of electrification is most applicable to British railways. Current collection from an overhead conductor suspended from gantries is, *The Times* feels sure, likely to be favoured by the Committee in preference to shoe pick-up from a third rail on the track. The latter is employed throughout the Southern Region, which is the greatest mileage of electrified surface lines in England, but overhead wire collection is used in several other localities in this country. Ever since d.c. was standardized for traction the introduction of higher voltages than the 600 V of the Southern lines has been anticipated. The forecast, if fulfilled, will thus not have been unexpected.

FOSTERING CANADIAN TRADE

ONE of the points made by Mr. R. H. Saunders, chairman of the Hydro-Electric Power Commission of Ontario, at the recent luncheon given by the Council of B.E.A.M.A. at which he was one of the guests of honour, was that the people of Canada were anxious to buy British goods, but that these must sell on their merits. A further opportunity for manufacturers to bring their products before Dominion buyers will be provided by a "British Trade Week" to be held in Manitoba and Saskatchewan during the period from 26th September to 1st October, when all traders have been asked to feature British goods. Plans have also been announced this week for a comprehensive British Tool, Machine Tool and Scientific Instrument display at next year's Canadian International Trade Fair in an effort to increase Britain's rather small share of imports of this kind.

SYMBOLIC NAMES

NEW ideas are not infrequently expressed inadequately in the nomenclature of a pre-art, whose terms may not quite fit the fresh conception. When a deficiency of this kind is realized, a more suitable name must be found. A university professor in the United States has recently pointed out an example in the use of the term "vector" to describe the directed lines (geometrical portrayals of complex quantities) employed in the treatment of sinusoidal functions. He puts forward the suggestion that the word "sinor" would be distinctive and more appropriate though coined.

Flash-Discharge Lamps

Some of the Newer High-Intensity Types

By A. H. WILLOUGHBY*
B.Sc., B.Sc. (Eng.)

DURING the past few years the flash-discharge lamp has become fairly well known, particularly as a photographic light source. Development started as far back as the early 1930's, but it was largely during the war years, when the work received impetus from service requirements such as aerial photography, that the present lamps were evolved.

The high-intensity lamp described below is one of a range which has been developed to assist the continuation of fundamental work on the properties of discharges at very high current densities, but as it has many features which are unique in the flash-discharge lamp field it has been thought worth while to give an interim description of some of its properties.

The flash discharge, with its very high loading, enters a more or less unknown region of phenomena and although some investigations of its characteristics have been made—more, in fact, than the literature would suggest—there is still much interesting work to be done, particularly at current densities which until recently had proved to be beyond the range of experiment.

The mode of operation of all flash-discharge lamps usually involves the discharge through the lamp of a capacitor charged to a high voltage. The energy dissipated in each flash may vary from a few watt-seconds in a small glass lamp to as much as several thousand in the largest quartz lamps. Most existing types have an arc path within a glass or quartz tube, which is generally either helical or linear. The former allows the use of a very long arc column, usually of the order of 50-100 cm, and is consequently preferred when high energy/flash is required.

All such lamps, however, are restricted in respect of the energy which they can dissipate per unit length of column and therefore the source size of lamps of high rating is too large to allow their use in any sort of accurate optical system. The linear type, which usually has a minimum arc length of some 5 cm, can produce a relatively narrow and flat beam of light when used with a parabolic trough mirror, but its energy dissipation and average source brightness during the flash are limited. The reason for this limit to the intensity or brightness of the flash (as measured by the total luminous output/flash divided by the effective surface area of the source) is understandable. The intensity is related to the energy dissipated/unit arc volume in each flash which, in turn, is limited by the thermal and pressure shocks it produces on the walls of the lamp.

A cursory investigation has shown that the thermal shock is the major limiting feature in a glass lamp, but is of little importance in a quartz lamp, owing to the extremely small coefficient of expansion of quartz. In quartz lamps, then, the shock produced on the wall by the rapid expansion of the internal gases is the major limitation on arc intensity and brightness. This fact was one of the main considerations in the design of the new range of lamps.

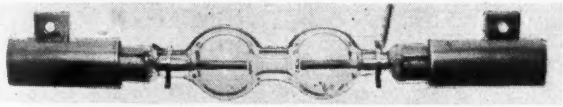

Fig. 1.—High-intensity flash-discharge lamp

An example from this later range (Fig. 1) differs from existing well-known types in that, whereas in the latter the discharge occupies most of the internal volume of the envelope, the new lamp has been designed to restrict the discharge

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to a comparatively small fraction of the total internal volume, leaving the remainder free to "cushion" the shock wave produced by rapidly expanded gas in the vicinity of the arc. In this way the pressure shock during the flash is kept to the minimum.

The lamp has an arc of 15 mm length and 4 mm diameter; it can dissipate up to 2,000 watt-seconds/flash with a flash duration of approximately 1 millisecond which, corresponding to an average dissipation of 2,000 kW, represents a loading of 10,000 kW/cu cm in the arc. Under these conditions the average brightness during the flash is of the order of 10^7 stilb, which is approximately 100 times as bright as the crater of the large high-intensity arc.

Of course, the flash duration is not limited to 1 millisecond; it can range from 50 microseconds to as long as $\frac{1}{100}$ of a second, but when the shorter flashes are used it is necessary to reduce the total energy dissipated during the flash, although the instantaneous loading/unit arc volume can be considerably increased. For instance, with a flash duration of 100 microseconds, a peak brightness of the order of 10^8 stilb is probably attainable, which is about 1,000 times as bright as the sun.

It is evident from these figures that this kind of lamp is capable of satisfying uses which are well outside the present range of flash-discharge lamps. In particular, it will produce with the aid of a parabolic reflector an extremely intense beam of light of small divergence.

The lamp is made entirely of quartz and (Fig. 1) is dumb-bell shaped. The light is produced in a thick-walled tube, at each end of which is a thick bulb. The electrodes are sealed into the bulbs and are arranged to terminate at the ends of the tube, to which the arc is therefore entirely restricted, the bulbs acting as gas cushions for the pressure wave generated in the tube during the flash. The bulbs serve a second purpose in that they accumulate small quantities of quartz which is evaporated from the wall of the arc tube; the quartz is driven by the expanding gas into the end chambers, where it settles as a white dust. The scavenging action of the expanding gases is so efficient that no trace of quartz dust is visible in the tube itself after many thousands of flashes, even though the end bulbs may be quite opaque. It is interesting to note in this connection that the absorption spectrum of silicon is observed against the continuous background of the radiation produced during the flash.

In operation, the main electrodes are connected through an air-cored inductance to a bank of capacitors charged to

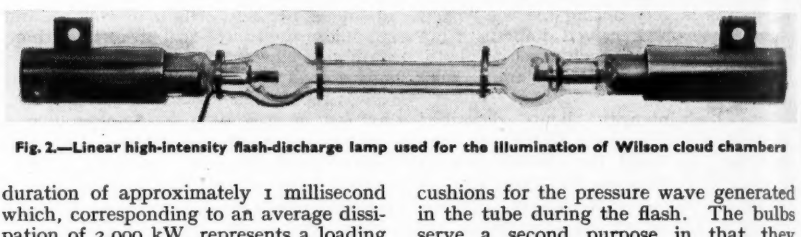

Fig. 2.—Linear high-intensity flash-discharge lamp used for the illumination of Wilson cloud chambers

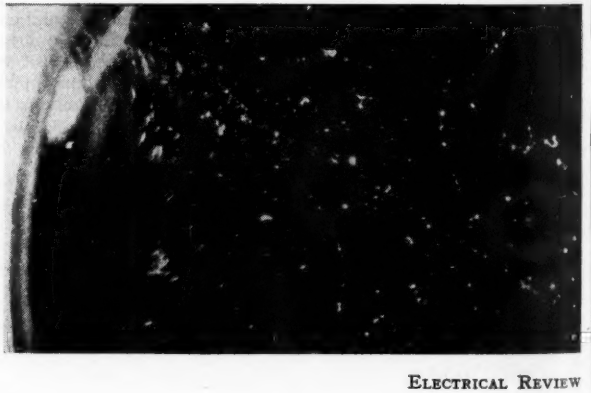

Fig. 3.—Particle tracks in a Wilson cloud chamber (photograph by Messrs. J. R. Atkinson and A. F. Howatson, of Glasgow University)

2 kV, breakdown being caused by applying to the external trigger wire a pulse voltage of some 15 kV. Such a pulse can be obtained from an ordinary car ignition coil by discharging a 0.1 μF capacitor charged to 500 V through its primary winding. The length of the flash is controlled by the inductance, 100-150 microhenries giving a pulse length of approximately 1 millisecond.

Another lamp in the range (Fig. 2) has been used for the photographic recording of sub-atomic particles in a Wilson cloud chamber, where a flat beam of intense light must be projected across the chamber. It has a source some 70 mm long by 4 mm diameter, so that, when mounted in a parabolic trough reflector, it produces the required flat beam. The lamp will dissipate some 1,000 watt-seconds with a flash duration of 1 millisecond, or 200 watt-seconds with a duration of 50 microseconds. Fig. 3 is a typical photograph taken with this lamp. The chamber diameter was 10 in. This photograph was obtained at 90 deg to the direction of the light beam.

All the lamps in this range are designed to be flashed relatively infrequently, not more than once every 10 seconds. Development is, however, proceeding with a view to producing lamps which have similar arc dimensions to those described above but can be flashed at high loadings many times a second. Such lamps will undoubtedly have many applications, not the least of which will be to a method of motion picture film projection in which the film moves continuously past the light source, apparent arresting of each frame being achieved by the rapidity of individual flashes.

N.W. Board Conferences

PLANNING, organization and administration questions were discussed at three conferences held by the North Western Electricity Board at Electricity Hall, Buxton, between 26th June and 9th July. The conferences, each attended by 52 officers and lasting 2½ days, were opened by Sir Joseph Hallsworth, chairman of the Board, and Mr. R. A. S. Thwaites, deputy chairman, was among the lecturers. Other Board members, Miss N. Kenyon, Mr. E. J. Smith and Mr. J. R. Potts, also attended various sessions, acting as chairmen and taking part in the discussions.

Papers given by senior officers dealt with such matters as the Board's relations with employees and the public, engineering planning, education and training, etc. At the engineering planning conference arranged by Mr. O. Howarth the different problems arising in dense urban and sparsely populated rural areas were discussed. It was felt that the knowledge thus gained would greatly help in getting planning engineers to work on common lines, though it is not intended that there should be complete uniformity.

Engineering staff of the North Western Board who attended the planning conference. Sir Joseph Hallsworth, chairman of the Board, is in the centre of the front row, with Mr. O. Howarth (chief engineer) on his right

Plan for Coal.—Speaking at the S.E. Coal Division's annual dinner at Dover on Saturday, Lord Hyndley, chairman of the National Coal Board, said that the Board hoped to have the outline of its national plan for the industry ready by the end of the year. Nothing on a comparable scale had ever been attempted before in Britain.

Views on the News

By REFLECTOR

IN his "N.E.C. Jottings" in the July issue of the *Electrical Power Engineer* "W. H. S." mentions that objection was taken to a stipulation said to be made by the B.E.A. that applicants for positions must have served at least a year in their present jobs. It was admitted that there are people who "hop from one job to another at short intervals, never remaining at one place long enough to learn the duties properly and who thereby place an additional burden on their colleagues." Nevertheless, a member thought that any such stipulation, if it existed, would be an interference with the "liberty of the subject." On this reasoning, might not any requirement in the way of age, etc., be so described?

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A series of letters has lately appeared in the *Western Mail* on the subject of the earliest introduction of electric lighting in Wales. One of the first installations is recorded as at the National Eisteddfod at Merthyr in 1881, where arc lamps were used for lighting the marquee. One correspondent, however, recalls that large arc lamps were installed at a Cardiff butcher's shop in 1879, which was visited by large crowds while the novelty lasted. A claim put forward for Llandrindod Wells, however, as the first town in the United Kingdom to adopt electricity as a municipal undertaking (in 1897) could hardly be substantiated.

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While on the subject of the early days of the industry, I was interested to see the other day a booklet on the jubilee of public electricity supply in South Australia. Actually the beginnings of electricity supply in Adelaide date back rather more than fifty years for the South Australian Electric Light & Motive Power Co. had a temporary plant in operation in 1891. It began in a very small way, with a 4½ kW 110 V d.c. steam-driven plant which was installed in a stable at the rear of a new grocery store—the company's first consumer. The development of the Adelaide undertaking, now controlled by the Electricity Trust of South Australia, will always be particularly associated with the name of the late Mr. F. W. H. Wheadon, whose connection with it in the positions of resident engineer, engineer and manager, director and chief engineer and manager lasted from 1899 until 1947.

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Having visited several agricultural shows recently, I think there is a lot to be said for the practice, started at the Three Counties Show and repeated at the Royal, of providing representatives on the joint Midland Electricity Board-Electrical Development Association stand with uniform, the women with cream overalls and the men with jackets of the same colour. As might be expected, there was at first some opposition from the men, but all are now agreed that it is a good idea. At agricultural shows there is a tendency for not only the visitors but also the representatives on the stands to wear apparel appropriate to rural life, and it is therefore of great advantage to be able to recognize the latter without having to rely on badges which can be seen only from the front.

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Electricity seems to have a special fascination for the people who contribute "useful" hints to the daily press. In one of the latest examples to come to my notice the writer of a paragraph entitled "Womansense" is concerned about making electric points safe from the "prying fingers" of small children. "Points should all be fixed well out of the child's reach," it is advised. "This is quite a simple conversion job. If the switch and point are combined the whole thing can be moved to a level of about four feet from the ground." No mention is made of the trifling matter of the wiring, and there is no warning of the danger which could result if the alteration were attempted by an inexperienced person.

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Shift workers please note. A report in the *Western Daily Press* is headed "Portishead and New Power Station. Five to Four Say No Sunday Putting."

Swiss Water Power

GRUYERE VALLEY DEVELOPMENT

Rossens Barrage under construction

IN October, 1948, the official inauguration took place of an 80,000 h.p. hydro - electric plant which had been installed in the lower Gruyere Valley, Switzerland, by the Entreprises Electriques Fribourgeoises. This company had already been operating four small plants in the valley for some time but the immense hydraulic resources of the River Sarina had hardly been touched.

When it was decided to build the new plant it became evident that considerable water storage would be needed. Consequently, a barrage was constructed at Rossens, 15 km from Fribourg, to retain 200 million cubic metres of water, of which 180 million cubic metres could be used. The new Gruyere lake which has thus been formed is 14 km long.

The barrage is of the vaulted type, 320 m long and with a maximum height of 83 m. An unusual feature is the thinness of the barrage in comparison with other structures of this type. If necessary, it can be emptied by alternative means. In the centre of the barrage are two conduits 2.8 m in diameter, each of which will pass 150 cubic metres of water a second. A gallery 150 m long and 4 m in diameter facilitates the flow of 280 cubic metres a second and a double floodgate is arranged to pass water at the rate of 350 cubic

The barrage on inauguration day

metres a second. Immediately behind the floodgate starts the 6 km supply pipe, which is 5 m in diameter and constructed in three sections. The first is 900 m long, the second 3,300 m, and the last, starting from the Hauterive plant, 1,900 m long.

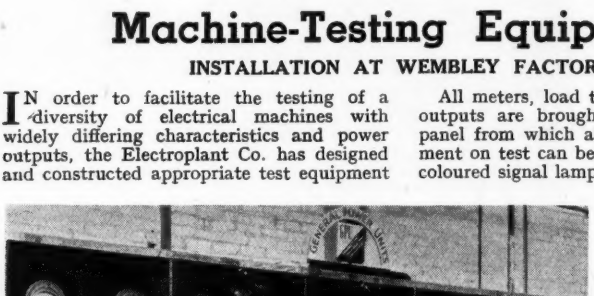
The surge chamber comprises a vertical cylinder 51 m in diameter and 60 m high which is linked to the supply pipe by a well 4 m in diameter and 50 m deep. The length of the supply pipe and the great mass of water it contains necessitated a carefully designed surge chamber to ensure stability in service. Topographical conditions governed the position of the plant, but its actual construction was most difficult and involved some danger to the workers.

Hydro-electric generating plant has been in existence on this site since 1904, but with recent alterations and additions the equipment comprises five groups developing a total of 80,000 h.p. The Rossens barrage provides Switzerland with an average annual production of 240 million kWh.

Machine-Testing Equipment

INSTALLATION AT WEMBLEY FACTORY

IN order to facilitate the testing of a diversity of electrical machines with widely differing characteristics and power outputs, the Electroplant Co. has designed and constructed appropriate test equipment at its Wembley factory. As the company specializes in the design, redesign and manufacture of unusual machines to suit individual requirements, the testing arrangements are such as to afford the maximum flexibility in use and permit the operational capabilities of any machine to be demonstrated with ease to the customer.



Main test panel at the works of Electroplant Co., Wembley

On the main control board the supplies include 400/600 V and 100/250 V d.c. for motors of up to 30 h.p., infinitely variable 250 V a.c., three-phase a.c. for loads up to 120 A per phase and a low voltage d.c. source capable of supplying 500 A. There is an independent d.c. supply of up to 600 V for separately exciting fields and testing small and large motors concurrently. Provision is also made for the absorption of single and three-phase loads of up to 100 kW.

All meters, load tanks, and a.c. and d.c. outputs are brought to a single terminal panel from which all connections to equipment on test can be taken, and a system of coloured signal lamps indicates which power supplies are switched on and which instruments are in circuit, thereby enabling several tests to be conducted simultaneously. The motor generator sets and transformers feeding the equipment are situated in a room immediately below the control board, while the actual machines being tested can be accommodated on the adjacent floor space where the test engineer can keep them under constant watch. Facility for examining small machines is provided by a bench which is situated in front of the switchboard.

Waterworks Radio Communication

SERVICE and maintenance vans used by the Brighton Waterworks Department have been equipped for radio communication so that it is no longer necessary to return to the engineer's office for further instructions when a job has been completed. Each vehicle is fitted with a Marconi 10 W transmitter/receiver and the main apparatus (also 10 W) is installed at the waterworks reservoir two miles from the engineer's office from which it is operated by means of a remote control unit via a G.P.O. telephone line.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Council of the **Institution of Electrical Engineers** has made the following award of premiums for papers read or accepted for publication during 1948-49:—

Group A.—Kelvin Premium: Messrs. C. W. Earp, B.A., and R. M. Godfrey, B.Sc. (Eng.). John Hopkinson Premium: Mr. G. F. Shotter.

Group B. — Non-Section Premiums: Messrs. A. Hamilton, B.Sc., and R. W. Sillars, B.A., D. Phil (Llewellyn B. Atkinson) and Messrs. J. H. Walker, Ph.D. (Eng.), M.Sc. (Eng.) (Extra). Measurements Section Premiums: Professor F. C. Williams, O.B.E., D.Sc., D.Phil., and Mr. T. Kilburn, M.A. (Silvanus Thompson), Mr. G. T. Winch (Mather), and Messrs. H. M. Gale, B.Sc. (Eng.) and P. D. Atkinson, M.A. (Extra). Radio Section Premiums: Mr. G. Millington, M.A., B.Sc. (Duddell), Mr. G. F. Gainsborough, B.Sc., Ph.D. (Ambrose Fleming), Mr. H. de B. Knight, M.Sc. (Extra), Messrs. W. A. Wooster, M.A., Ph.D., Nora Wooster, M.A., Ph.D., J. L. Rycroft, B.Sc., and L. A. Thomas, B.Sc. (Extra), Mr. D. G. Tucker, D.Sc., Ph.D. (Extra), Mr. B. G. Pressey, Ph.D., M.Sc. (Eng.) (Extra), Messrs. H. G. Hopkins, Ph.D., and F. Horner, M.Sc. (Extra), Messrs. C. F. Floyd, M.A., and R. L. Corke (Extra), Messrs. C. F. Booth, O.B.E., and J. P. Johns (Extra), Messrs. H. T. Mitchell and T. Kilvington, B.Sc. (Eng.) (Extra), and Messrs. F. E. Williams, M.Sc. (Eng.) (Extra). Supply Section Premiums: Mr. H. M. Lacey, B.Sc. (Eng.) (Sebastian de Ferranti), Mr. H. Headland, M.Sc. (John Snell), and Messrs. C. H. Flurscheim, B.A., and E. L. L'Estrange, M.Eng. (Extra). Utilization Section Premiums: Messrs. B. Adkins, M.A., and W. J. Gibbs, M.Sc. (Eng.) (Crompton), and Mr. T. P. Wakeford (Swan).

Group C.—Fahie Premium: Mr. W. H. Grinsted, M.B.E. Paris Exhibition (1881) Premium: Mr. H. W. Grimmitt. Webber Premium: Messrs. C. Crampton, O.B.E., B.Sc., W. Struszynski, Dipl. Ing. (Warsaw), S. de Walden, Dipl. Ing. (Warsaw), and P. G. Redgment, M.A. Overseas Premium (for senior members): Messrs. H. D. Einhorn, Dr. Ing., Ph.D., and J. D. Sauermann, B.Sc.

Students' Premiums (value £10): Messrs. J. W. R. Griffiths, P. H. Hammond, B.Sc., H. A. Prime, B.Sc., and J. R. Waters. Students' Premiums (value £5).—Messrs. B. D. Jenkins, B.Sc., A. K. McAuslan, I. J. Shelley, and D. J. Wythe.

Mr. R. F. Turner has resigned from the board of Dow-Mac (Construction), Ltd.

Mr. H. Pryce-Jones, M.Eng., manager of the Mid-Sussex Sub-Area of the South Eastern Electricity Board, tells us that he is included in a short list of seven selected for interview for the appointment of chairman of the Victoria State Electricity Commission.

The Welding Sections of the British Electrical and Allied Manufacturers' Association have nominated as their representative to B.E.A.M.A. Council, 1949-1950, **Mr. R. W. Ayers,** who is chairman of the Resistance Welding Machine Section of the Association and managing director of Sciaky Electric Welding Machines, Ltd.

Mr. S. Erickson, chief design and development engineer to Vidor, Ltd., has resigned his position with the company, to take up duties with a Government branch. During his appointment with Vidor, in conjunction with his director and sales manager, he was responsible for the design of all their radio, television and domestic appliances. Before joining Vidor, Mr. Erickson was for many years with General Electric Co., Ltd., and Morphy-Richards.

Outside the electrical stand at the Kent Agricultural Show (see page 165). Left to right: Mr. R. Levitt (assistant commercial officer, Kent Sub-Area, S.E.E.B.), Mrs. H. Knell, Mr. H. Knell (manager, Kent Sub-Area) and Mr. R. D. Reynolds (area officer, South Eastern and Southern Area, E.D.A.).

Mr. George Merredew, a director of Ernest W. Merredew, electrical engineers and contractors, Kingston, Surrey, has been made a magistrate of the borough.

We are sorry to hear that **Mr. E. E. Hoadley,** who retired from the position of Maidstone district manager of the South Eastern Electricity Board at the end of March, has been ill and is in the Royal Masonic Hospital for examination. Our readers will join with us in wishing him a speedy recovery.

The fifth annual sports meeting of the **Telcon Social and Athletic Club** (Telegraph Construction & Maintenance Co., Ltd.), was held at the recently enlarged Telcon Sports Ground, Kidbrooke, on 9th July. At the conclusion of a programme of fifty-two events, Lord Colgrain, chairman of the company presented the prizes to the winners who were introduced by Dr. G. A. V. Sowter, chairman of the General Purposes Committee of the club. The Sir Geoffrey Clarke Challenge Cup was won by the Metals Department for the third year running. Lord Colgrain, who has been a director of the company for fifty-two years, presented long-service certificates to members of the staff. Among those present were Sir Geoffrey Clarke (managing director) and Lady Clarke, Mr. J. N. Dean, Mr. B. H. Musgrave and Mr. W. F. Randall (directors), Dr. E. W. Smith (director of Submarine Cables, Ltd.), Mr. F. Leighton (works manager) and Mr. G. L. Lawford (secretary of the company).

Maentwrog and Rhostyllen were visited by members of the **I.E.E. Mersey and North Wales Centre** for their summer meeting, held on 16th July. At Maentwrog the large party of members and their ladies were shown round the hydro-electric station by Mr. A. R. Cooper, B.E.A. regional controller, Mr. J. Warnock, divisional hydro-electric engineer, Mr. H. Gill, resident engineer, and Mr. E. L. Roberts, station superintendent, and a film show on the Scottish hydro-electric schemes was provided. A buffet lunch was arranged in a marquee on the site by Mr. A. Alderson, divisional catering supervisor. At Rhostyllen, an evening meal was served by the canteen staff of the Mersey and North Wales Electricity Board, and members of the Board's staff also gave a musical entertainment.

A day's holiday was spent in Blackpool on 9th July by 1,250 workers of **Oldham & Son, Ltd.** Each employee was presented with a gift of 10s, in addition to an envelope containing railway ticket, souvenir programme with meal and refreshment vouchers, Oldham lapel "flash" badge, and special ticket of admission to the Tower Ascent and ballroom and other places of amusement. Special trains were used to transport the large party. Luncheon and tea were served at the Winter Gardens and presided over by Mr. S. J. Wrigglesworth, director and general manager. In the course of a short address, the chairman and joint managing director, Mr. J. Oldham, O.B.E., J.P., mentioned that a new French company, with works at Arras, had been registered this month in the name of Société Française des Procédés Oldham. After lunch, members of the party dispersed to enjoy themselves, and reassembled for tea, when a civic welcome was accorded them by the Mayor and Mayoress of Blackpool.

Once again the sports day of **Johnson & Phillips, Ltd.,** held at Kidbrooke on 9th July, was blessed with perfect weather. A full programme was well supported both by competitors and by a large number of spectators, and perhaps the most exciting event was the victory of the champion departmental tug-o-war team from the local friends and rivals, Telcon, over the champion home team. The large array of prizes was presented by Mrs. W. Glass, wife of the company's joint managing director.

The annual staff outing of **F. Westerman (Wholesale), Ltd.,** took place on 9th July, when staff and friends visited Church Stretton, Carding Mill Valley and Ludlow. The annual sports were held at Church Stretton during the morning. In the late afternoon the party moved on to Ludlow for tea, and later spent the evening in the ballroom of the Compasses Hotel.

Watliff Co., Ltd., recently held a staff dinner at the Criterion Restaurant, London. The chairman, Mr. W. Martin Hume, congratulated all on the achievements of the past financial year. Other speakers were Miss R. Jones, purchase manager, Mr. F. Brown, factory supervisor, and Mr. W. E. Arnold, managing director.

Obituary

Mr. E. Kocher.—The death is reported from Shanghai of Mr. Erich Kocher, for many years a director of the Siemens China Co., and from 1931 to 1938 managing director of Siemens Schuckert (Gt. Britain), Ltd., London.

Wills

Mr. J. T. Mertens, M.I.E.E., late chief engineer and agent to the Calcutta Electric Supply Co., Ltd., left £53,151 gross (£52,516 net).

Mr. H. W. Rowell.—In the notice in our issue of 10th June we stated that the late Mr. Rowell was founder of Ellison Insulations, Ltd. (now Tufnol, Ltd.). We are informed by Tufnol, Ltd., that this is incorrect. Mr. Rowell was an employee of the organization, having joined George Ellison, Ltd., for research work before the formation of Ellison Insulations, Ltd., which is now known as Tufnol, Ltd.

Industrial Radiography

PROTECTIVE EQUIPMENT FOR HANDLING RADIOACTIVE SOURCES

GAMMA-RAY radiography is now firmly established in industry as a method of inspecting castings, welded assemblies and other engineering components, suitable radium and radon sources being obtainable from the Government-owned Radiochemical Centre at Amersham. For many years Johnson, Matthey & Co., Ltd., have maintained a laboratory to carry out research in this field and to develop improved radiography techniques. Particular attention has been given to devising methods of reducing the amount of radiation to which the operator is exposed. As a result a number of equipments have been designed which have proved efficient and simple to operate. Arrangements have now been made to manufacture these in quantity so that they may be generally available.

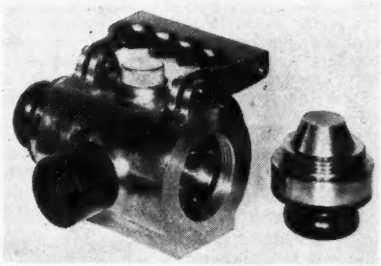


Fig. 1.—Portable carrier designed to serve both as a convenient source for radiography and as a storage unit

Instructions may thus be given to the Radiochemical Centre for sources to be sent to the Johnson Matthey laboratories at Wembley where they will be fitted into approved carriers. In this way the user can avoid the major risks associated with the handling of unscreened radioactive materials.

Most industrial radiography is carried out by means of 100 or 250 microgramme radium sources, whose use demands every possible precaution. Satisfactory results may sometimes be obtained from sources as small as 15 or 30 microgrammes, but these will obviously suit only a limited range of inspection work.

To house the larger sources a standard portable carrier (Fig. 1) has been devised which is suitable for both storage and transport. It weighs only 38 lb and can be handled with ease. The protection given by this equipment is extremely good and at a distance of three feet from a carrier containing a 250 microgramme source the radiation is less than 0.2 röntgen per day. This carrier can also be used to house radon or other gamma-ray sources up to the value of 250 millicuries.

The carrier is machined from a phosphor bronze casting and incorporates a thick

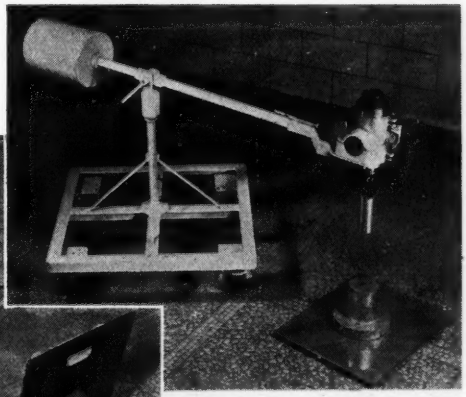


Fig. 2 (above).—Mobile stand enabling the easy handling of the source in its protective carrier

Fig. 3 (left).—Time-controlled exposure unit employed in panoramic exposures when a number of objects may be radiographed at one time

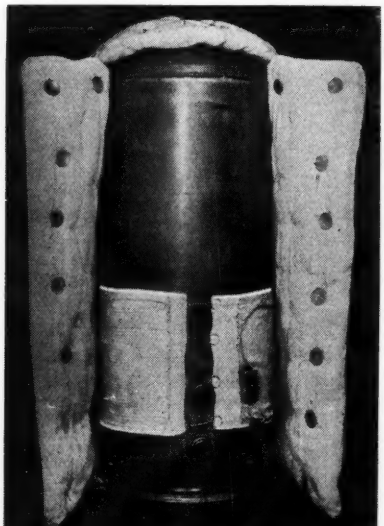
liner of copper-tungsten Elkonite, which has a high co-efficient of absorption of radiation. The radium source, in a platinum container, is held at the centre of the carrier by a clip mounted on an Elkonite rod and may be extracted by means of a handling extension which, after the knurled cap at the top of the carrier has been removed, can be screwed into the rod bearing the source. Two heavy conical plugs are fitted in the ends of the carrier, which are so designed that the operator's hand is not exposed to direct radiation while they are being removed or replaced.

In making single exposures the portable carrier may be mounted upon a mobile stand (Fig. 2) for which an accessory device for accurate sighting is made. The design of the carrier is such that upon the removal of one of the conical plugs a uni-directional radiation beam of fairly narrow angle is released. After the sighting device has been used to bring radium source, carrier orifice and object exactly into line, the conical plug is removed and the exposure made.

Panoramic exposures, by means of which the radiography of 40 or more castings may be carried out simultaneously, are made by combining the portable carrier with a time-controlled exposure unit (Fig. 3). This is a small motor driven lifting device which may be set to operate at a certain time up to seven days in advance, and to make an exposure of predetermined duration. The operating rod of the unit is screwed into the rod which supports the source and at the chosen time it lifts the radium from the carrier to a height of roughly 7.5in from the floor. When exposure is complete the source is automatically returned. By use of this unit, it is simple to ensure that operators are at no time subjected to harmful radiation. Exposures can be arranged to take place in a cleared room at any convenient time of the day, or during the night. A button switch for manual operation of the unit is fitted; in addition there is a warning light which operates only when the source is exposed. Sockets are provided to allow extension of the lighting circuit to give a remote warning.

Lagged Surface Heaters

AS an alternative to immersion heaters in hard-water districts where scaling is troublesome Isopad., Ltd., 13-17, Rosemont Road, London, N.W.3, is manufacturing a heating and lagging jacket which is placed around the outside of the cylinder. These "Isoheaters" consist of two parts; the actual heating jacket or "Isopanel" and the "Isolagging" which covers it and the whole cylinder surface, the former being made by interweaving fibre glass yarn with silicone dipped heating wire. A bimetal thermostat of the snap action type is fixed to the heating panel in such a position that its action is governed by the water temperature only.



Typical 20 gallon copper cylinder with "Isolagging" partly removed to show the "Isopanel" and thermostat

The heater normally covers about a quarter of the cylinder surface, which permits operation at low wattage densities of the order of 4W per sq in, thereby reducing scale deposits. This low loading makes it possible to run at higher temperatures in hard water districts to get better heat storage facilities for a given size of cylinder.

The fitting of the appliance is quick and simple. The heater is wrapped round the surface of the cylinder, usually just above the bottom circulator connections, and fixed firmly in position by springs hooked into rings provided on the two ends of the heating mat. This ensures close contact between the element and cylinder surface, in spite of expansion and contraction of the vessel. The "Isolagging" forms an integral part of the arrangement and the makers are not supplying or recommending the use of the "Isopanel" alone.

Short Time Rated Resistances

Formula for Calculating Energy Dissipated

By W. de RENZI, B.Eng.

THE main function of short time rated resistances is to absorb energy by raising the temperature of the active material when in circuit and to dissipate the heat by radiation and convection when they are cut out or not in use. In some situations, such as steelworks, they are often subjected

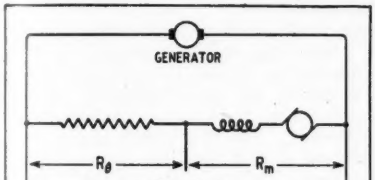


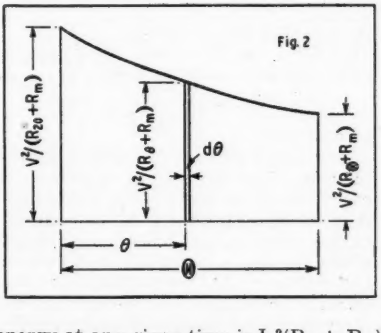
Fig. 1

to considerable abuse. The later sections of such resistances may be called upon to carry the currents incidental to moving the controller to the later steps with the motor stalled. It is clear that these later sections must have enough active material to absorb the heat generated under these abnormal conditions without reaching a dangerous temperature.

Many metallic resistance materials have a high temperature co-efficient and due to the increase of ohmic resistance as the material heats up, it is a complex matter to calculate exactly how much energy is dissipated in a resistance section. It is all too often estimated by some rough-and-ready approximate rule which may be given an inaccurate result. The usefulness of a general formula which will enable the amount of energy to be calculated exactly in a variety of cases will, therefore, be obvious. With most resistance materials in common use the curve showing the relationship between the increase of resistance and the temperature rise is very nearly a straight line over the working range of temperature. This fact simplifies the derivation of a general formula. The specific resistance of a material is generally quoted at a temperature of 20 deg C and temperature co-efficients refer to temperature rises above 20 deg C.

The general formula can be derived by considering a circuit (Fig. 1) in which a resistance section of ohmic resistance R_θ in series with a motor of ohmic resistance R_m is connected to a constant potential source of supply. In the following calculations V = line volts; θ = temperature rise at any given time; R_θ = ohmic resistance of section with a temperature rise of θ deg C; R_{20} = ohmic resistance of section at 20 deg C; R_m = ohmic resistance of motor (considered constant); Θ = maximum temperature rise; α = temperature co-efficient; I_θ = current at any given time; $A = R_{20}/(R_{20} + R_m)$ and $B = R_m/(R_{20} + R_m)$.

The total resistance in circuit at any given time is $(R_\theta + R_m)$ and from the definition of temperature co-efficient $R_\theta = R_{20}(1 + \alpha\theta)$. The rate of dissipation of



energy at any given time is $I_\theta^2(R_\theta + R_m)$ or, by substituting $\frac{V}{R_\theta + R_m}$ for I_θ, $V^2/(R_\theta + R_m)$. Since R_θ increases as θ increases the rate of dissipation of energy in the circuit decreases from $V^2/(R_{20} + R_m)$ when $\theta = 0$ to $V^2/(R_\Theta + R_m)$ when $\theta = \Theta$ (Fig. 2). The mean rate

of dissipation of energy is therefore $\frac{1}{\theta}\int_0^{\theta} V^2/(R_\theta + R_m)d\theta = \frac{V^2}{\theta(R_{20}+R_m)}$ $\int_0^{\theta}\frac{d\theta}{(1+A\alpha\theta)}$ which on evaluation becomes

$$\frac{V^2}{(R_{20}+R_m)}\left[\frac{2.3026}{A\alpha\theta}\text{ Log }(1+A\alpha\theta)\right] \quad (1)$$

This indicates that the mean rate of dissipation of energy in the circuit is the initial rate of dissipation multiplied by some factor depending on the final temperature rise and the temperature coefficient of the material.

The mean rate of dissipation of energy in the resistance section only is found by calculating the mean rate of dissipation of energy in the motor and subtracting it from equation (1).

The current I_θ at any given time is $\frac{V}{(R_\theta + R_m)}$, which may be rearranged to to the form $\frac{V}{(R_{20}+R_m)}\left[\frac{1}{(1+A\alpha\theta)}\right]$. The rate of dissipation of energy in the motor at any given time, $I_\theta^2R_m$, is therefore $\frac{V^2R_m}{(R_{20}+R_m)^2}\left[\frac{1}{(1+A\alpha\theta)^2}\right]$ or

$$\frac{V^2}{(R_{20}+R_m)}\left[\frac{B}{(1+A\alpha\theta)^2}\right] \quad .. \quad .. \quad (2)$$

The mean rate of dissipation of energy in the motor is the integral of this expression divided by θ, which becomes

$$\frac{V^2}{(R_{20}+R_m)}\left[\frac{B}{(1+A\alpha\theta)}\right] \quad .. \quad (3)$$

Therefore, the mean rate of dissipation of energy in the resistance only is

$$\frac{V^2}{(R_{20}+R_m)}\left[\frac{2.3026\text{ Log}(1+A\alpha\theta)}{A\alpha\theta} - \frac{B}{(1+A\alpha\theta)}\right] \quad .. \quad (4)$$

The application of the above formula may be illustrated by considering the case of a neutral point earthing resistance. A common specification for such a resistance gives particulars of the supply, either the ohmic resistance or the current it has to carry and the time it is in circuit (usually 30 seconds). If the current only is specified, the ohmic resistance required under short-circuit conditions is calculated by dividing the phase voltage by the current. In this case there is no motor in circuit, therefore $R_m = 0$, from which it follows that $A = 1$ and $B = 0$. Substituting these values for R_m, A and B in equation (4), the mean rate of dissipation of energy is found to be

$$\frac{V^2}{R_{20}}\left[\frac{2.3026\text{ Log}(1+a\theta)}{a\theta}\right] \quad .. \quad .. \quad (5)$$

Now if w is the weight of active material in grammes, β the specific heat of the material and T the time in circuit in seconds, the energy dissipated is

$$\frac{V^2T}{R_{20}}\left[\frac{[2.3026\text{ Log }(1+a\theta)}{a\theta}\right] \text{ joules or}$$

$$\frac{V^2T}{4.2\,R_{20}}\left[\frac{2.3026\text{ Log }(1+a\theta)}{a\theta}\right] \text{ calories (6)}$$

which can also be expressed as $w \times \theta \times \beta$ calories (7).

By equating equations 6 and 7 the weight of active material in grammes is found to be

$$\frac{V^2T}{4.2R_{20}\beta\theta}\left[\frac{2.3026\text{ Log }(1+a\theta)}{a\theta}\right] \quad .. \quad (8)$$

which can easily be converted to pounds.

Once the required weight of active material is known, it is a simple matter to select the most suitable resistance grids. In the above calculations no allowance has been made for any loss of heat during the time the resistance is in circuit, which is mainly due to transference of heat from the active material of the grids to the marginal strips and insulating and supporting material. Allowance for this loss can be made either by adding a percentage to the real weight of active material in a grid or by using a fictitious figure for the temperature rise θ, which is in excess of the permissible temperature rise. The latter method is preferable because the actual temperature rise will not exceed the fictitious temperature rise. The allowance to be made with either method can only be determined by tests on a prototype resistance.

It is questionable whether any considerable allowance should be made for loss of heat in the case of a resistance material, such as silicon steel, which has a high temperature co-efficient. It is possible that the loss of heat by the strands adjacent to the marginal strips and supports might result in a lower total ohmic resistance, in which case the higher current flowing would heat the strands midway between the supports to a higher temperature than that which would be attained if the grids were evenly heated throughout.

In the case of starting resistances where

a motor is connected in series with the resistance section, the equation for calculating the required weight of active material is obtained by using equation (4) for the rate of dissipation of energy. This gives the result

$$w = \frac{V^2T}{4.2\beta\theta(R_{20} + R_m)}\left[\frac{2.3026 \text{ Log } (1 + A\alpha\theta)}{A\alpha\theta} - \frac{B}{(1 + A\alpha\theta)}\right] \text{ grammes} \quad .. \quad (9)$$

The use of this equation may be illustrated by determining the minimum weight of active material in the last section of a starting resistance if it is to be capable of standing up to the kind of abuse postulated in the first paragraph of this article. Fig. 3 shows the theoretically correct grading of a 5-step resistance for use with a d.c. series motor which is designed to pass 100 per cent of full load current on the first step. The ohmic values are expressed in terms of the basic ohmic resistance of $R = V/I_m$, where I_m is the full load current of the motor. On the fourth controller step, section R4 — R5 is in series with the motor. It will be assumed that the resistance material is a silicon steel with a temperature coefficient of 0.00175 per deg C, a specific heat of 0.113 and a permissible temperature rise of 300 deg C, the 15 b.h.p. 230 V motor having a full load current of 56 A. By inserting the appropriate values in equation (9), it will be found that $w = 227T$.

Generally speaking a resistance section will stand up to gross abuse if, when it is carrying the greatest current which can flow, the time T taken for the material to attain the maximum permissible temperature rise is not less than 10 seconds. If T = 10 in the above calculation, then the minimum weight of active material required is 2270 grammes or 5.02 pounds. In an actual design for a 5-minute rated resistance for a 15 b.h.p. series motor the weight of the active material in section R4—R5, arrived at by considering the normal use of the resistance, was 2570 grammes. In this case section R4—R5 satisfies the test of its ability to stand up to abuse with a margin in hand. Due to the loss of heat to the marginal strips and insulating and supporting material the temperature rise would be of the order of 280 deg C but not exceeding 300 deg C.

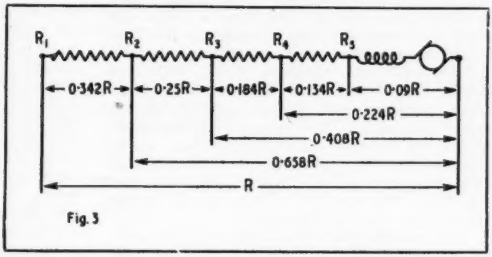


Fig. 3

TRANSPORT NOTES

A REPORT on the suggested future planning of the north-eastern area, prepared on behalf of the Ministry of Town and Country Planning, urges the electrification of the railway line on the south side of the Tyne to Sunderland and on the Newcastle-Carlisle route as far as Ryton and later to Hexham. Another suggestion is that Newcastle-on-Tyne Central Station should be reconstructed on two levels, the lower being reserved for suburban electric trains and the higher for long distance trains. The report has been prepared for the Ministry by Sir George L. Pepler and Mr. P. W. MacFarlane.

Newcastle-on-Tyne City Council will shortly replace the Scotswood Road tram service with motor buses. It had been expected that the change-over would be made by the end of June, but delay in getting buses held up the work. Twenty buses are needed for the service. After this change, the only trams still running under the control of the City Council will be those needed to maintain a service into Gateshead.

The accounts of the Sheffield Corporation Transport Department for 1948-49 show that there was a combined deficit (trams and buses) of £47,231 as compared with a surplus of £39,157 in the previous year. The report indicates that substantial wage increases had to be faced and the losses would have been considerably heavier but for the improved revenue position.

NEW BOOKS

Electronics in the Factory. Edited by Prof. H. F. Trewman. Pp. 187; figs. 63; index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 20s.

This book has been written almost entirely by members of the staff of Electric and Musical Industries, Ltd. Its object is to provide executives in industry with up-to-date information concerning the ways in which electronic devices can help production and quality control. It takes the view that knowledge concerning these matters is not sufficiently widespread, and discusses also (in the first chapter) how the electronic engineer and his outlook can best be introduced into the factory.

The principal subjects dealt with are delay and timing circuits, counting equipment, regulation of current and voltage and control of motors and generators, dielectric and eddy-current heating, welding, servo-mechanisms and photocells. There are also chapters on applications in chemistry and medicine, the last of which seems out of place in a book of this kind.

The descriptions are fairly "popular" and reasonably lucid, if one assumes that the type of reader for whom the book is intended will readily absorb most of the technical terms in electronics. One might, however, expect that those who can do this would be able to understand and would be helped by a few more symbols and diagrams.—V. J. F.

Electrical Timekeeping. By F. Hope-Jones. Pp. 279; figs. and index. (Second edition.) N.A.G. Press, Ltd., 226, Latymer Court, London, W.6. Price 21s.

This second edition of one of the best accounts of past and present methods of measuring and recording time electrically will be welcomed, particularly as the author has brought his work up to date by including developments which have taken place since the first edition was published in 1940. A foreword is contributed by the Astronomer Royal, Sir Harold Spencer-Jones.

The book begins with a short survey of the mechanical type of clock, leading to the earliest attempts to "electrify horology." Then follows a very interesting section on the methods of controlling rotary motors from pendulums. This chapter includes an account of "T.I.M.," the Post Office "speaking clock," and there is now an equally good additional section on the Horstmann-Clifford magnetic escapement, an invention which will probably become familiar in commercial form before very long. Self-contained clocks are described in Chapter VII, and at the end is a much-needed caution to architects and engineers against the indiscriminate use of synchronous motors for the direct actuation of large tower clocks. As the author says, the electrically wound form of clock, either with its own escapement or under the control of a master-clock of correct design, is the most trustworthy kind of public timekeeper at present. Subsequent chapters trace the growth of the modern "master-clock" with its "impulse-dials."

The really outstanding chapters follow. They describe the development of the free-pendulum. The next part deals with synchronous clocks and the time service afforded by controlled-frequency a.c. mains. No attempt is made to praise or blame and the synchronous clock is fairly described, though the contrast between our way of doing things and that prevailing in the U.S.A. makes depressing reading. The rather vexed subject of timekeeping at sea is covered in Chapter XXVI, and there is some modification from the first edition to bring in recent systems. Finally, there is an additional chapter containing a well-written account of the quartz-crystal clock.

An excellent glossary and index are included together with a list of Shortt-Synchronome free-pendulum clock installations. A very good feature of the new edition is that it has been re-illustrated; an exception is the drawing of the Grimthorpe gravity escapement on page 120, which still seems wrong.—T. R. R.

Books Received

Electricity. By C. L. Boltz, B.Sc. Pp. 311; figs. 150; index. George G. Harrap & Co., Ltd., 182, High Holborn, London, W.C.1. Price 8s 6d.

Principles of Electricity and Electromagnetism. By G. P. Harnwell (2nd edition). Pp. 670; figs. and index. McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, London, W.C.2. Price 36s.

Technology of Plastics. By B. Lionel Davies, M.Sc., A.R.I.C. Pp. 421; figs. 106; index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 37s 6d.

Elements of Electromagnetic Waves. By L. A. Ware. Pp. 293; figs. and index. Sir Isaac Pitman & Sons. Price 20s.

Outline of Radio. By R. S. Elven and others. Pp. 688; figs. and index. George Newnes, Ltd., Tower House, Southampton Street, W.C.2. Price 21s.

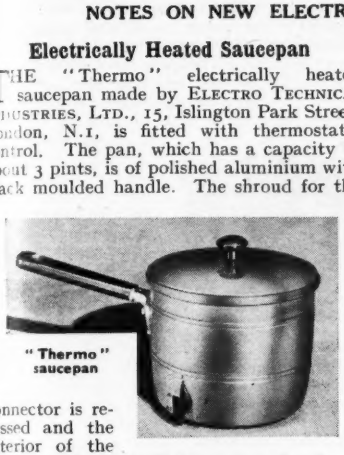
Diesel Vehicles. By F. J. Camm. (5th edition). Pp. 107; figs. and index. George Newnes, Ltd. Price 6s.

RECENT INTRODUCTIONS

NOTES ON NEW ELECTRICAL AND ALLIED PRODUCTS

Electrically Heated Saucepan

THE "Thermo" electrically heated saucepan made by ELECTRO TECHNICAL INDUSTRIES, LTD., 15, Islington Park Street, London, N.1, is fitted with thermostatic control. The pan, which has a capacity of about 3 pints, is of polished aluminium with black moulded handle. The shroud for the

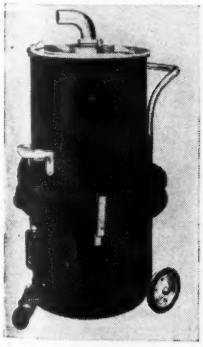


"Thermo" saucepan

connector is recessed and the interior of the pan is entirely free from rivet heads or other obstructions. The loading is 750 W. The a.c. model costs 39s 6d and the universal type 2s 6d more.

Industrial Vacuum Cleaner

For use where extra strong suction is required, the SERVICE ELECTRIC CO., LTD., Secomak Works, Honeypot Lane, Stanmore, has brought out the "Secomak" model 51 industrial vacuum cleaner, the power unit of which consists of two centrifugal type fans, one pulling out of the container and the other out of the first fan. By this form of two-stage fan a water lift of 55in is obtained and an air volume of 165 cu ft. The power unit, enclosed in the base of the drum below the dust container, is easily accessible by tipping the machine so that it rests in a horizontal position with the handle on the ground.



"Secomak" model 51 industrial vacuum cleaner

The motors, which are of the universal type with a consumption of 1,200/1,600 W, can then be seen through the end. The exhaust air circulating round the bottom of the drum keeps the motors cool. The 1½ cu ft dust bag can be removed and replaced in a few seconds.

An opening in one side of the container enables a flexible hose to be attached to the exhaust when required, so that the machine can be used for blowing. Attachments are available for hot air blowing and for spraying paint, insecticides, etc. The machine is 41in high and has a wheelbase 20in wide by 27in long. The weight, without hose, is 110 lb and, with all accessories, 130 lb. The cylindrical steel container is mounted on rubber-tyred wheels and ball-bearing castor. The short wheelbase ensures easy manipulation in confined spaces. The price complete with all suction attachments is £98.

A modified pattern of the machine, designed specially for chimney sweeping, costs £125, complete with a full set of sweeping accessories. With 10ft of 2in hose only, the price is £98.

Miniature Soldering Iron

A miniature soldering iron somewhat like a pencil in size and appearance has just been placed on the market by E. K. COLE, LTD., Southend-on-Sea. It is neat in design, small in weight (only 2.5 oz) and can

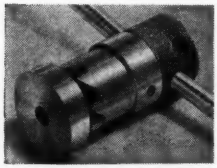
Ekco miniature soldering iron

be comfortably handled all day without overheating. Power may be derived either from a battery or from the mains via a suitable transformer which is available. The rating of the tool is 10 W and models can be supplied for operation from 6, 12 or 24 V supplies. An outstanding feature is the quick heating of the bit to soldering temperature, which is only fifty seconds.

Automatic Feed Hole Cutter

When using a hand tool employing the hollow mill and pressure pad principle to cut holes in tanks, etc., bad results are often obtained through inaccurate adjust-

ment of the cutter feed. This disadvantage is not present with a cutter made by EUCO TOOLS, LTD., 44, London Road, Kingston-on-Thames, as it incorporates a self-feeding device which automatically increases the cutter feed when necessary. This device consists of a

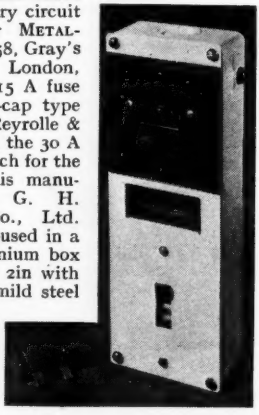


Euco automatic feed hole cutter

hardened feed nut which is operated by a ball clutch mechanism contained in the body of the tool. With the tool in position at the commencement of the hole-cutting operation, the clutch is in engagement with the feed nut. As soon as the tool is operated the cutter is automatically fed into the material to a depth dependent on the resistance of the material to the cutting teeth.

Cooker Control Unit

An inexpensive cooker control unit incorporating a separately fused three-pin 15-A round pin socket outlet for the auxiliary circuit is offered by METALFORM, LTD., 258, Gray's Inn Road, London, W.C.1. The 15 A fuse is of the pull-cap type made by A. Reyrolle & Co., Ltd., and the 30 A micro-gap switch for the cooker itself is manufactured by G. H. Scholes & Co., Ltd. The unit is housed in a die-cast aluminium box 9in by 3in by 2in with a bonderized mild steel front cover plate, the whole being finished in cream stove enamel.



Metalform cooker control unit

"Double-Life" Batteries

After an absence from the market of over eight years, the "double-life" automobile battery made by the CHLORIDE ELECTRICAL STORAGE CO., LTD., Exide Works, Clifton Junction, nr. Manchester, is again available. Apart from possessing all the good features of the standard "Exide" battery, it incorporates dual separation comprising a combination of wood and glass wool. Between each pair of positive and negative plates there is fitted not only the usual separator of treated wood, but an impregnated sheet of finely felted glass wool. The wood separator provides a porous diaphragm between the plates and ensures freedom from short circuits. The glass wool sheets, which are highly porous, reinforce the armouring of the positive plates and help to retain the active material so that the life of the cells is lengthened. To prevent corrosion, the end terminal pillars are furnished with oil-impregnated felt washers directly underneath the cable connections. Porcelain vent plugs are also fitted incorporating a baffle device and expansion chamber to keep the top of the battery dry. The makers give an unconditional guarantee of two years' service or free replacement with each battery.

Exide "double-life" automobile battery

Shadowless Lighting Fittings

Continuing their range of shadowless lighting fittings, ALLEN & POPE, LTD., 14, Shacklewell Lane, Dalston, London, E.8, have now produced one- and two-light brackets to match their "Ring" pendant.

Wide Range Stroboscope

A stroboscopic lamp unit for speed measurement or the examination of moving parts has just been added to the range of products made by TAYLOR ELECTRICAL INSTRUMENTS, LTD., 419/424, Montrose Avenue, Slough, Bucks. It is mains operated, portable, and has been designed for continuous use under industrial conditions. A discharge lamp controlled by a valve oscillator is incorporated in the unit and its flash rate is indicated on an illuminated dial calibrated in r.p.m. A vibrating reed and trimming devices are also provided so that the dial speed calibration may be checked against mains frequency. Furthermore, the lamp may be locked to the mains frequency for

Taylor wide-range stroboscope

slip tests or synchronized by an external contactor for stroboscopic viewing independent of speed fluctuations. The instrument has two ranges, 500 to 3,500 r.p.m. and 3,500 to 25,000 r.p.m., the accuracy of calibration being within one per cent when standardized against mains frequency.

Sanitation Unit

For use where public sewerage is not available the improved "Electrosan" unit now being made by WARREN PRODUCTS, LTD., 72, Victoria Street, London, S.W.1, is claimed not only to eliminate all odour but also to provide complete sterilization. Operating from a 6 V or 12 V battery, it can be used in aircraft, caravans, boats, trains, etc. The apparatus comprises two units. A series of precision balanced plates of pure electrolytic copper held by insulated spacing bolts and backed by a spacing screen clips into the closet container, while to control the electricity supply is a small box fitted with a resistance and an automatic push-button vacuum switch, which is operated after each use. Consumption is so small that batteries will run many months without recharging.

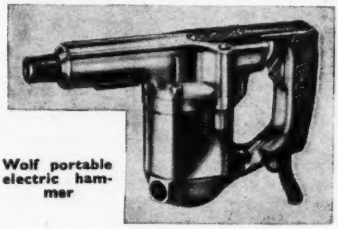
"Electrosan" unit with control box

Pre-set Clock

In addition to the pre-set clock in moulded case a walnut model is now available from SMITHS ENGLISH CLOCKS, LTD., Sectric House, Waterloo Road, Cricklewood,, London, N.W.2, at 100s, plus 22s purchase tax. Besides their use for switching on and off radio and television sets these units are useful as a burglar deterrent for switching on lights when the house is unoccupied and for controlling shop window lighting, etc.

Portable Electric Hammer

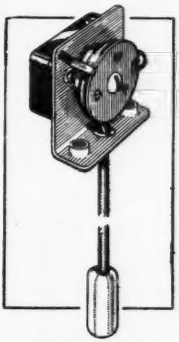
There are many possible applications for the portable electric hammer which has just been placed on the market by S. WOLF & Co., LTD., Pioneer Works, Hangar Lane, Ealing, London, W.5. It may be used for boring brickwork or for insertion of conduit up to $\frac{7}{16}$in diameter. It weighs only 7 lb with an overall length of 12in, and is powered by a $\frac{1}{3}$ h.p. universal motor rated at 200 W. The oscillating motion of the spindle is derived from a "Scotch Yoke" driven by the motor which is mounted at 90 deg to the barrel. A heavy duty trigger switch incorporated in the handle facilitates control and a refinement is provided by the telescopic dust-proof spring steel cover fitted to the tool holder.



Wolf portable electric hammer

Cord Pull Switch

A cord pull switch, which CASTELCO (GREAT BRITAIN), LTD., Castle Works, High Street, Old Woking, Surrey, have just put into production, is of neat and sturdy construction, with a smooth action. Including the switch base the unit occupies a space approximately 1in cube. Fixing is either by two tapped 4 B.A. threaded holes or by slots.



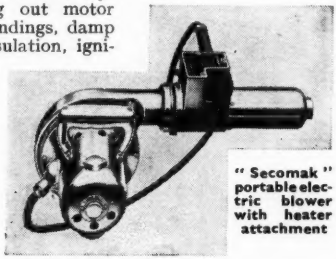
Castelco cord pull switch

Hot Air Blower

A heater attachment now available for use with "Secomak" portable and "Statair" stationary blowers made by the SERVICE ELECTRIC CO., LTD., Secomak Works, Honeypot Lane, Stanmore, gives hot air at temperatures up to 400 deg F. The device fits either directly to the air outlet of the blower or can be connected by means of flexible hose or rigid tube. Since hot air is not usually required at such high velocity as cold air, the attachment automatically reduces the fan speed to give suitable pressure and volume of hot air. Full velocity and volume at reduced temperature can be obtained by connecting the blower and heater independently to the mains. A limited amount of air temperature variation may be obtained by regulating the blower motor speed. The standard model heater has a loading of 2 kW,

but 1 kW and 3 kW loadings are available if required. The weight of the attachment, without cable, is 2¾ lb.

Among many suggested uses for hot air blowers are drying out motor windings, damp insulation, igni-

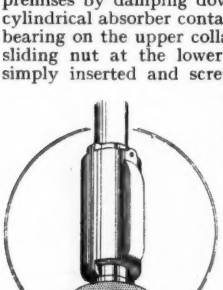


"Secomak" portable electric blower with heater attachment

tion plugs, tanks, chemicals, etc.; removing condensation from conduits and refrigerator units; starting frozen motors; thawing frozen water pipes; drying and preheating compound filled chambers before pouring; drying cable trenches and cables after flooding; heating plastics, etc.

Anti-Vibration Lamp Suspender

Following the production of the Kenwell tee-box cover incorporating a ball socket for protectively suspending lighting fittings from conduit, an easily fitted anti-vibrator has now become available. Together they should prolong the life of lamps in industrial premises by damping down vibration. The cylindrical absorber contains a coiled spring, bearing on the upper collar, and an internal sliding nut at the lower end. Conduit is simply inserted and screwed into the nut,



Anti-vibration "Kenwell" sleeve and ball socket ceiling box cover

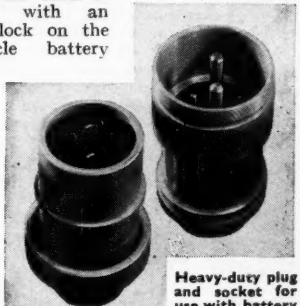
so that movement can take place much like that of a piston in a cylinder.

The lamp fitting is screwed directly to the lower end of the anti-vibrator, earthing continuity being through the cushioning spring to the conduit and ball socket cover, which is bridged for the purpose by a flexible copper pigtail fitted internally.

Two sizes are available, a light one for industrial dispersive reflectors, with 200 W lamps, weighing about 5 lb and a 17 lb model for fluorescent trough reflectors. Both anti-vibrator and ball socket cover are "Mazak III" alloy castings produced by Small Pressure Die Castings (Bacup), Ltd., Lanehead Works, Bacup, Lancs, and distributed to the wholesale trade by the sole agent, MR. ARTHUR SHARPLES, 46, Lisle Street, London, W.1.

Heavy-Duty Plug and Socket

A lightweight plug and socket designed for use with battery operated vehicles is now available from ELECTRO-HYDRAULICS, LTD., Liverpool Road, Warrington, Lancs. It has two main current pins continuously rated at 80 A d.c., but which will also carry up to 200 A intermittently, and two smaller auxiliary pins rated at 10 A. One of the latter supplies 12 V for auxiliary services and the other is used with an interlock on the vehicle battery



Heavy-duty plug and socket for use with battery operated vehicle

charger. All insulation is of moulded material and the body of both parts is made from light alloy, there also being an arrangement for gripping rubber cable.

Travelling X-ray Theatre

AT the instance of the Ministry of Health and the Department of Health for Scotland, the Ministry of Works has designed and produced a special vehicle with which to equip mass radiography units operated by Regional Hospital Boards as part of the National Health Service. At present most of these units, although readily transportable from one point of installation to another, have not been fully mobile. Improvement in the service began some time ago with the provision of a certain number of specially built vans which contained a power-generator to work the mass X-ray apparatus where no other suitable power might be available. The Ministry of Works has now designed and produced a new and better type of vehicle which enables the films to be taken inside the vehicle with the same speed and efficiency as when the mass X-ray apparatus is set up and worked in a building.

Industry and the House

Chancellor's Statement on Economic Situation

BY F. J. ERROLL,
M.A., A.M.I.E.E., M.P.

THE statement by the Minister of Labour concerning the steps which must be taken to reduce the load during the peak periods in the coming winter (given fully on page 101 of the *Electrical Review* of 15th July, 1949) came as a fitting prelude to Mr. Gaitskell's announcement on the following Monday that the surcharge will not be continued next winter. This surcharge has been a sore point with most M.P.s during the last two months as the big bills began to come in to their constituents. Everyone was glad to learn that the system is now buried once and for ever. Even on this occasion one Member, Mr. W. R. Williams, asked if last winter's charges could be refunded if they could be proved to have imposed a great deal of hardship on people living in all-electric houses. The suggestion, Mr. Gaitskell said, was quite impracticable.

With non-ferrous metal prices in this country still many pounds per ton above world prices hopes that the London Metal Exchange would be reopened, even on a limited scale, have been fairly widespread. The Minister of Supply has, however, made it clear in answer to Sir Waldron Smithers, that the Exchange cannot be reopened under present circumstances as it would not be able to operate effectively within the limitations which would have to be imposed. The Minister's mind is, however, still open regarding the future marketing of tin.

Balance of Payments

Informed newspaper comment had prepared the House of Commons, and indeed the country as a whole, for Sir Stafford Cripps' statement on the balance of payments on Wednesday, 6th July. The reduction of the gold and dollar reserve of the sterling area by £60 million to a little over £400 million was announced by the Chancellor in a statement which imparted the grave news in a manner calculated to avoid excessive alarm. Indeed, the statement has been criticized by Members of all Parties for having been too mild and reassuring in tone. The Chancellor, however, has wisely avoided a premature announcement of emergency measures, but has preferred to warn the country that these would be coming as soon as they had been worked out.

The occasion for a further statement came eight days later on the first of two Parliamentary days devoted to a debate on the economic situation. In the interval the House had witnessed the gradual development of the dock strike, and had granted the Government Emergency Powers to deal with it. The House was, therefore, in a sombre mood when it settled down to listen to Sir Stafford's hour-long speech on Thursday, 14th July.

Reduction in Dollar Imports

The Chancellor made it plain that imports from the dollar area would have to be reduced by £100 million a year. This would not solve the problem of the dollar gap, but it would serve to reduce the drain on our dollar reserve during the coming year. There will be certain reductions in the import of dollar foods, but increases from the non-dollar areas should offset these decreases. It is, therefore, in the field of industrial raw materials that the most serious reduction must be made. Naturally he was anxious to reduce these imports with the least possible damage to our productive effort and he hoped that no question of any general scarcity would arise. The cutting of dollar raw materials would produce some inequality between industries, but the principle to be adopted would be that of continuing to import those materials which were small in volume or cost but which played an altogether disproportionate part in the smooth running of any particular industry. The Government intends to concentrate on large items where the effect of cutting can be most easily foreseen and calculated. Thus purchases of non-ferrous metals from the dollar area would be reduced by about 25 per cent, and we should also have to cut part of our imports of steel. Nevertheless, he hoped

that a continuing high level of domestic production would offset the most serious effects of this cut.

The search for a long-term solution of the dollar problem had, he continued, made an auspicious start with the meeting of United States and Canadian representatives. He could not, of course, say anything more at this stage, but he reaffirmed the intention to maintain "the strength of our great multilateral area of trade, the sterling area."

His long speech concluded with a general homily to industry. Production methods must be brought up to date and kept at the highest point of efficiency. Uncompetitive sections of industry must be examined. Costs must be reduced and new ideas employed.

Mr. Oliver Lyttelton, replying for the Opposition, set the general tone of the Conservative Party's criticism. The Economic Survey for 1949 had underlined the depth of the Government's miscalculation. What needed saying was that the situation was deteriorating rapidly, and that these cuts were only a small foretaste of what was going to hit the country. The policy of the Government was further doses of small cuts suitably presented to the people with a minimum of urgency. The public was being deluded and the situation could not be dealt with just by a readjustment of exports. There must, he asserted, be movements of capital between the Western and the Eastern hemispheres.

The House recognizes that in the present deepening crisis there is a fundamental cleavage of viewpoint between the two Parties. The Socialists maintain that the present difficulties can be overcome by an extension of present methods, and that the heavy burden of Government expenditure on social services can and indeed must be maintained. The Conservative Party hold that there must be a return to hard work and a full reward for genuine effort. The frills of Government expenditure must go and the slackers be sacked. Which course the country would rather pursue can only be known by means of a General Election. The school of thought which favours a November Election is therefore steadily growing.

PARLIAMENTARY NEWS

By Our Special Reporter

WHEN the Lords amendments to the Wireless Telegraphy Bill were considered by the Commons, Mr. Paling, the Postmaster-General, moved to disagree with the amendment empowering the Postmaster-General to make regulations prescribing the requirements for avoiding undue interference. He said it was impossible that highly technical regulations could be framed to secure that certain people using apparatus for household purposes would not have to pay more than a florin in complying with the regulations. The amendment would take outside the Bill the bulk of domestic apparatus that might be causing interference, and would be likely to impair the co-operation which had been a rather good factor in the situation up to the present time, and would help, if anybody, the people who were most difficult.

Mr. Grimston said the purpose of the amendment was to put some ceiling on what an ordinary housewife, for instance, using domestic apparatus might be called on to pay to make apparatus free from interference. He thought that if this provision were put in the Bill there would be more of an urge on the Postmaster-General to get the manufacturers to attack the problem from their end.

Sir Ian Fraser said that since the purpose of getting rid of the interference was to enable television viewers to see the picture more clearly, and since they, therefore, would be those who enjoyed the benefit of it, they should pay for it. They ought to pay an extra 1s or 2s 6d on their licences to provide a fund out of which to compensate the housewife for the extra charge put on her.

Mr. Hobson, the Assistant Postmaster-General, said it seemed to be the general impression that interference from domestic apparatus affected only television sets. That was far from being the case. Where there was an escape of electro-magnetic energy there could be interference with wireless sets, which was the most common form of interference. Further, if the Lords amendment was agreed to, it meant that interference from domestic apparatus could jeopardize safety equipment for the landing of aircraft or in connection with navigation.

Mr. Erroll described the statement as

most unsatisfactory. It was obvious that if there were any question of safety to aircraft or ships the necessary powers would be willingly granted to the Postmaster-General, but he was not asking for those powers for those specific cases, but to apply his restrictive activities generally.

The motion to disagree with the Lords amendment was carried by 232 votes to 78.

Television Plans

Mr. Janner asked the Postmaster-General, in view of the prominence which it was proposed to give to television in the Exhibition of 1951, what new plans there were for developing television in this country.

Mr. Paling said that a plan for extending television to serve the main centres of population had been made. How quickly the various stations in the plan could be built depended on the economic situation, but he hoped it would be possible to start building the northern station next year.

Efficiency Experts

Replying to Mr. Sidney Shephard, Mr. Harold Wilson, President of the Board of Trade, said that 32 technical officers were employed in the Production Efficiency Service at an approximate cost of £30,000 per annum. Their qualifications were a recognized engineering training, followed by several years of practical experience on problems associated with the efficiency of production. During the eleven months ended December 31, 1948, 208 firms consulted them, of which 84 were minor cases.

Battersea Gas-Washing Plant

Mr. Hastings asked the Minister of Fuel and Power if he was aware that the British Electricity Authority and its predecessors had been unable to introduce gas-washing plant at the Battersea power station so that to-day only 30 per cent of the emission was washed and that, while the north-west chimney would be reconditioned by the autumn, the installation of 100 per cent washing would be postponed to the spring of 1951, with the result that much of the discharge of smoke, grit and noxious fumes would continue for another two years; and what action he proposed to take.

Mr. Gaitskell said he was kept informed of the progress of this work. Battersea was a modern station which produced very little smoke. It was already equipped with mechanical arrestors which eliminated nearly all the grit. While at present only 30 per cent of the chimney gas was washed to eliminate sulphur, the completion next month of the reconstruction of the north west tower would result in 70 per cent of the gas being washed. Every effort was being made to complete the work necessary to wash the remaining 30 per cent, but the space in which the work had to be done was so confined and the working conditions were so difficult, that there was very little hope that this last stage could be completed before the spring of 1951.

Voluntary Economy

Mr. Edgar Granville asked the Minister of Fuel and Power if it was his intention to allow industrial and domestic users of light and power to exercise voluntary as against compulsory economy next winter.

Mr. Gaitskell said that arrangements for load spreading which would operate next winter in the industrial and commercial field were described in the statement made by the Minister of Labour on 5th July. It was not proposed to continue the differential tariff for domestic consumers but he must again emphasize that great economy in the use of electricity by all clases of consumers at times of peak demand would be necessary next winter if extensive load-shedding was to be avoided. As in the past, the Ministry intended to rely on the voluntary co-operation of all concerned to achieve these economies, although under Defence Regulations he was empowered to direct any commercial or industrial undertaking to reduce its load if it did not do so voluntarily.

Surcharge

Mr. Rankin asked the Minister of Fuel and Power if he proposed to direct the refunding to electricity consumers of the amounts paid through the surcharge imposed on them during the three winter months less the amounts represented by the rebate during the remaining months of the year. Mr. Gaitskell said he did not.

Live Rails

Colonel Clarke asked the Minister of Transport how many children had been electrocuted in the past year on live rails, other than those belonging to the London Transport Executive; and what steps were being taken to prevent children getting access to these lines.

Mr. Barnes said that the answer to the first part of the question was 11 killed and 12 injured during 1948. As regarded the second part, full information was given on pages 27 to 29 of the report of the Chief Inspecting Officer of Railways for 1948.

Col. Clarke referred to a report that an expert committee considered overhead transmission more economical than the live rail method, and asked the Minister if he would assure the House that no more rails would be electrified and that overhead transmission would be employed instead.

Mr. Barnes said he could not pledge the future, but in the Shenfield scheme the overhead system was being introduced.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents

The Differential Tariff

BEING one of the first and most vigorous agitators against the introduction of the differential tariff, I am particularly interested to see that this ill-conceived plan has been dropped.

Since I have refused to accept any surcharge by deducting this from my account, or to accept any relief in the summer quarter by adding back the amount so included in my account, I am particularly intrigued by Mr. Gaitskell's considered view that a refund of charges is "not practical." That, surely, is hardly the point. There is such a small thing as right and wrong to be considered, and so very much more complicated problems have been tackled without any qualms that this piece of obstinacy could surely, in the interests of justice, be challenged.

Having regard to the terms of reference included in the Electricity Act, is there not a lawyer who could express an opinion as to the legality of the retention by the Electricity Board of money collected which has no regard to the costs of the generation or distribution of electricity? Furthermore, that this should be applied to one section of the community and not to another (i.e., those who have slot-meters) is a fact which Mr. Gaitskell should not be allowed to skate over quite so easily by using the excuse of impracticability.

MORTIMER, GALL & CO., LTD.
J. Mortimer Hawkins,
Managing Director.
London, E.C.4.

Registration of Contractors

I AM surprised that so ardent a student of the electrical Press as Mr. Alex Milne is "at a loss to understand" the two points in the paper by Mr. P. G. Wallis, on which he commented in a letter published in your issue of 24th June. The first point particularly has been discussed on many occasions and received its full share of publicity.

Mr. Milne need have no doubt that the members of the E.C.A. would not only welcome the compulsory registration of contractor and operative—they are working hard to achieve it. They just don't think it can be done via the N.R.E.I.C.

As for the second point, would Mr. Milne care to explain why he has his "doots" that the E.C.A. is really a voluntary register?

I must take exception to Mr. Milne's statement that "neither the E.C.A. nor the N.R.E.I.C. can guarantee high-class work"—especially as he proceeds to "prove" his contention by quoting the reports of the Register in support of his argument, forgetting, apparently, that in the second paragraph of his letter he has complained of the E.C.A. withdrawal from the N.R.E.I.C. Members of the Electrical Contractors' Association (Inc.) can and *do* provide high-class installation work which is guaranteed by the Association.

L. C. PENWILL,
Director and Secretary,
Electrical Contractors' Association (Inc.).
London, W.C.2.

Electronics Exhibition

THE fourth annual exhibition to be organized by the Institution of Electronics was held this week at the College of Technology, Manchester. The exhibits included an interesting novelty by the Research Department of the Metropolitan-Vickers Electrical Co., Ltd., in the form of an electrostatic clutch working on the principle that when a polished disc of high-resistance semi-conductor and a polished metal disc are pressed lightly together and a potential is applied between them, a force of attraction is developed. The company also showed experimental photoelectric radiation pyrometers, a miniature oscilloscope and a 0.25 h.p. electric speed control unit incorporating thyratrons controlled by a magnetic amplifier.

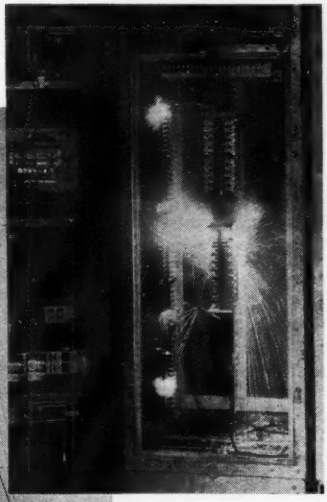
Ferranti, Ltd., displayed equipments which illustrated the application of various industrial valves, a transportable stroboscopic unit, the "Synchrolite," and a self-balancing servomechanism which will observe an error in any of several forms.

The items shown by the Chloride Electrical Storage Co., Ltd., indicated the wide range of uses of batteries in the operation of electronic and allied devices. In addition to an electronic revolution counter, the Plessey Co., Ltd., displayed a two-stage electron microscope, magnetic materials, and vibratory power packs.

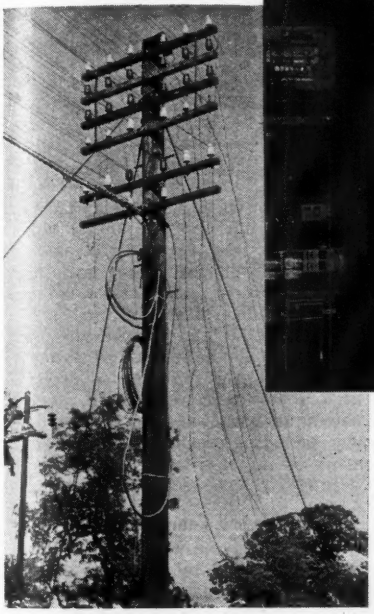
Telephone Line Protection

RESULTS OF TESTS IN HUNTINGDONSHIRE

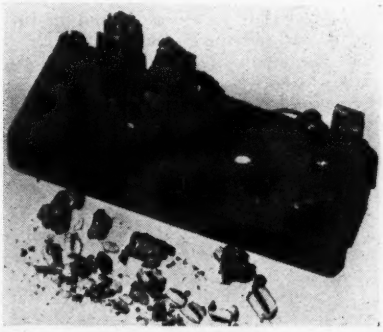
IN this country, where overhead telecommunication routes are crossed by high-voltage power lines a "cradle" is erected under the latter to avoid the damage which might be caused to telephone equipment if a power conductor were to break. Such guarding is costly, and the reliability of modern power lines is such that a conductor rarely breaks. It has been considered, therefore, that guarding arrangements might be modified (see *Electrical Review*, 8th April, 1949, page 581) so the G.P.O. agreed to carry out tests to see what the effect was when a 33 kV live conductor fell on to a telephone line. The tests were arranged under field conditions in Huntingdonshire. A site was chosen on the Gamlingay-Waresley road where a telephone route of 36 bare wires and a 20 pr/40 lb lead-covered aerial cable existed. A length of eight spans of this route was isolated by removal of all wires for a span at each end and transferring the working circuits to temporary interruption cables clear of the test route. A cradle-guard existed where the 33 kV line from Little Barford power station to Shepreth crossed over the telephone test route. The cradle - guarded crossing was not altered, but a 0.1 sq in copper wire connected to one phase of the power line was taken to a specially erected span over the telephone route, the



The discharge of the fuses and protectors of the exchange equipment during the second test indicates considerable fire risk



One pole of the span after the third test, which resulted in all of the telephone wires being broken



Damage to a subscriber's protector and fuse unit after the third test

loose end being held in an insulated clamp which had a rope-operated release mechanism. At the point of crossing, the telephone route was reduced to 18 wires plus the aerial cable. Wooden huts were erected at each end of the route, and the 18 wires were connected at one end to typical manual and automatic public exchange equipment, and at the other end to subscribers' telephones and private branch exchange equipment. The methods of wiring and cabling and the equipment were standard for rural areas, and included one-pair drop wire connections to individual telephones.

Test Conditions

The neutral of the power line was earthed at Little Barford through large earthing resistors. This limited the current which flowed when the power conductor touched the telephone wires to roughly 900 amperes. The telephone wires discharged the current to earth by breakdown to sheath of lead-in cable insulation and the normal telephone line protectors. The duration of the current was 1.32 seconds in the first test, the normal setting for the earth leakage protection on the power line. Two further tests were made, the duration being decreased in Test 2 to 0.77 second, and increased in Test 3 to 2.98 seconds. The normal voltage of the phase conductor was 19 kV to earth, but, as the earthing resistance formed a large part of the total earth fault circuit resistance, the voltage to earth of the power conductor at the test site fell much lower than this during the fault condition. In the first two tests the voltage fell to 2,800 V, and in the third it fell and then rose to 5,000 V.

The damage to the overhead telephone route in the first test was reduced by the aerial cable which carried the current to earth as soon as the power conductor touched it. Only one telephone wire was broken, but the underground lead-in cables broke down at each end.

For the second test the top layer of six telephone wires and the aerial cable were removed. Only one telephone wire was broken, but the lead-in cables broke down and a protector unit caught fire.

In the third test the longer duration of current caused prolonged arcing between the power conductor and the telephone wires and between the telephone wires themselves, which were all broken.

In every test the insulation of the lead-sheathed cables which were used to lead-in some of the open wires to the exchanges broke down and the lead sheath was punctured or ruptured. Oscillograms showed that the voltage affected all the wires at the same instant. This is attributed to breakdown of the lead-in cables. The voltage limiting effect of this reduced the damage to fuses and protectors connected to these cables.

The one pair overhead drop leads, which were of insulated wire, did not break down to earth, but the protector units suffered a heavy discharge, causing damage to some of them.

There was no damage to telephone exchange equipment at the "exchange" end in any of the tests, with the exception of the fuse mountings, which had to be replaced after the first two. At the "subscribers'" end a flash-over occurred between the impulsing spring contacts of a telephone dial and the metal finger plate. This was earthed through a 2,000-ohm resistor for Test 1 only, and was intended to simulate a man dialling. The current which flowed through it exceeded 0.5 A, a fatal current for most people. The telephone was not seriously damaged, but the dial needed replacement. Some damage occurred to the private branch exchange switchboard in Test 3, including breakdown of a rectifier element, arcing on a lamp and jack, and on a plug and extension jack strip.

General Conclusions

In the opinion of the G.P.O., these tests show that if the precautions now taken were modified it would cause great danger of electric shock to subscribers telephoning and to linemen working on the route. Damage to lead-in cables and protectors might well cause isolation of adjacent telephone exchanges. The characteristics of the power system used in this test restricted the power dissipation at the test site to some 5 MW and the voltage to earth to 5,000 V. Greater power would be available in the case of a solidly earthed 33 kV line, and even more with a 132 kV one. Further tests with a higher voltage line are to be arranged.

Electricity in Farming

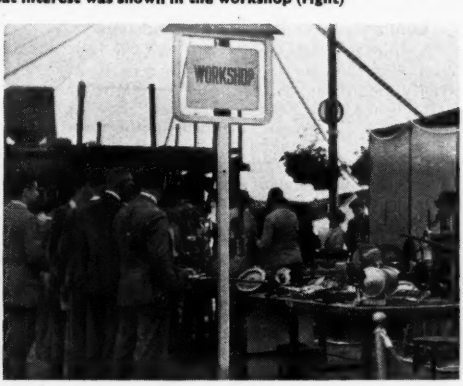
WIDESPREAD APPLICATIONS DEMONSTRATED AT AGRICULTURAL SHOWS

SEVERAL striking electrical displays were to be seen at agricultural shows held last week. At the Hertfordshire Show at Tring one of two prefabricated display units prepared by the Eastern Electricity Board and the British Electrical Development Association was used. Transported in twenty railway trucks, it required only a few hours to erect in its marquee, and the various sections arrived already wired. The general arrangement of the special farming sections of these units is the same at each showing, but the domestic exhibits in the centre are changed to meet local circumstances, the Chiltern Sub-Area in this case being responsible for the display.

One particularly interesting feature of the display was the use of colour to emphasize the character of the various sections, e.g., green for horticulture and blue for water. Paintings were also included in the displays to represent the appropriate views to be seen from the windows of the buildings concerned.

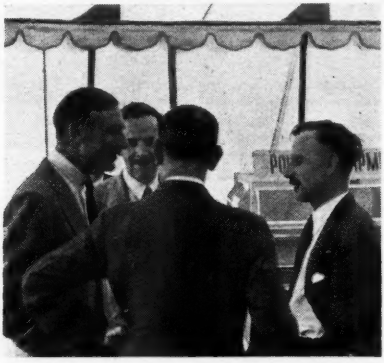
Soil sterilizing, soil heating and bulb pasteurizing were the subjects covered by the market gardening section. For the farmyard were to be seen pumps of all kinds, portable motors, insecticide sprayers, cattle clippers, dehorners, fences and lighting equipment. Goat as well as cow milking plant, sterilizers, churns, refrigeration plant bottlers and water heating apparatus were included in the dairy section, where, as elsewhere, everything possible was shown in operation. In the barn machinery section a flashing unit indicated the uses of a 1 h.p. motor, while the conversion of a cake breaker to electrical operation was also demonstrated. Besides incubators, brooders,

The E.D.A.-E.E.B. stand at the Hertfordshire Agricultural Show, Tring (heading picture). At the S.E.E.B.-E.D.A. stand at the Kent Show the modern milling section was incorporated in a special barn structure (below left), and great interest was shown in the workshop (right)



etc., air conditioning plant was among the poultry equipment on view.

Models and photographs were used to show methods of crop drying. Workshop tools were also represented. The various domestic sections covered domestic and commercial cookers, vacuum cleaners, washers, water heaters, clocks, refrigerators and miscellaneous appliances. Fluorescent lighting was used throughout. Outside the marquee items of special interest were a pig swill boiler, a small mill, pneumatic elevators, a rope hoist and a lawn mower. A final exhibit was a switchboard in actual use to supply the whole showground.



At the S.E.E.B.-E.D.A. stand at the Sussex Show: Mr. Norman Elliott (left), chairman of the Board, in conversation with Mr. Cameron Brown (right), B.E.A., and other members of the S.E.E.B. staff

Among individual manufacturers' displays were those of Howards Refrigeration (Frigidaire refrigeration plant), George W. King (portable pneumatic grain conveyors, hoists, etc.) and Kingston House Stores (mowers).

Comprehensive Display at Maidstone

A 240ft by 50ft stand (180ft by 40ft covered) provided by the South Eastern Electricity Board and E.D.A. was the centre of attraction at the Kent Agricultural Show at Maidstone. The main entrance, in the form of an old barn flanked by haystacks, gave the stand a truly farm atmosphere, while large sections signs mounted on posts "country inn" fashion were a prominent feature of the interior display. One especially striking exhibit was a modern barn showing various electrical applications—root crushing, grinding, grain elevating, pumping, etc., particular emphasis being laid on the conversion to electrical drive and the small amount of space required for the motors. Also of especial interest was a fully-operational workshop complete with circular saw, wood and actual lathes, hammers, drills, grinders, morticers, welders, spray painting equipment, forge, etc.

In addition to actual equipment out of doors, E.D.A. models were used to show applications of electric heating to cloches, hotbeds, greenhouses, frames, etc. Also in the horticultural section were examples of fruit sterilizers, soil sterilization and bulb pasteurizing plant, insecticide sprayers, hedge cutters and lawn mowers. Apart from a display of dairy equipment, including milking machines, refrigeration and sterilizing apparatus, steam raisers and water boilers, churns and a hand dryer, there were continuous showings of the film, "Clean Milk Production," attended altogether by about a thousand persons. Poultry equipment was also well represented, and there were also examples of electric vehicles.

Correct farm wiring methods were indicated by a special display, and there was a section devoted to battery chargers. Domestic appliances were also included, with model kitchens. The stand switchboard was of the type used for farm installations.

On a stand arranged by the Maidstone Branch of the Electrical Contractors' Association were to be seen motors, agricultural vacuum cleaning equipment, electrical water softening plant, sterilizers, domestic appliances, clocks and radio apparatus. A model dairy was a feature of a Frigidaire display of refrigeration plant. All the cooking and water heating at the show was done electrically.

As the Sussex Show was held at Hassocks on the same dates as the Kent Show, the S.E.E.B.-E.D.A. stand was smaller than usual. The main theme was modern dairy farming, under which electrical methods were demonstrated, from the preparation of food to the cooling and storing of milk. Attention was also drawn to the provision of an adequate water supply by electric pumping plant, and lighting units showed the advantages of fluorescent lighting. A cabinet incubator and brooder indicated the way in which electricity catered for the poultry farmer. Applications of electricity in the home were given a prominent place.

Electric Open-Hearth Furnace

The first electric open-hearth furnace in Sweden, forming part of the new steel plant of the Fagersta Works, in Central Sweden, was recently brought into operation and was inspected by Crown Prince Gustaf Adolf, reports the *Anglo-Swedish Review*. It takes eight tons of scrap at a time and is the largest open-hearth furnace in the country. The plant is to be completed in 1950; the total cost will be in the region of Kr 20 million (£1,380,000).

COMMERCE and INDUSTRY

D.J.A.C. Inaugural Meeting : Contractors' Holiday Decisions

THE inaugural meeting of the District Joint Advisory Council for the East Midlands was held at Nottingham recently when the East Midlands Electricity Board entertained the members of the Council to luncheon. Among those present was Mr. J. W. Thomas, director of training, safety and welfare, B.E.A. Mr. C. R. King was elected chairman of the Council and Alderman M. Lowe (National Union of General and Municipal Workers), vice-chairman. Mr. I. S. G. Mackenzie was appointed secretary. His address is : Midlands Electricity Board, Mucklow Hill, Halesowen, nr. Birmingham. The problem of the establishment of local advisory committees was passed to the General Purposes & Efficiency Committee for consideration, and a report will be submitted at the next meeting of the Council.

Opportunities in Canada

Canadian distributors are most anxious to buy British goods, but British manufacturers should realize that what they offer must be comparable in price, quality and design with equivalent Canadian and American products. This is the conclusion of Mr. C. F. Richards, managing director of Morphy-Richards, Ltd., on his return to London following an extensive tour of Canada. He said he was certain that British manufacturers could take a big slice of the Canadian market providing their campaign was properly planned from the beginning. Apart from giving products the right sort of "eye appeal," manufacturers must have a properly planned policy of distribution and advertising.

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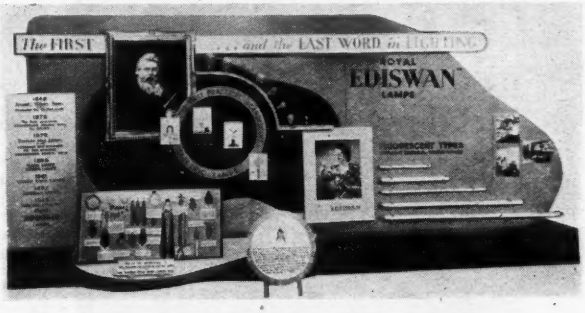
"Ediswan" Window Displays

Two special displays have recently been produced for the windows of the Edison Swan Electric Co., Ltd. One, "The First and Last Word in Lighting," traces the steps from the first incandescent electric lamp to the rival Swan and Edison lamps; then on to the amalgamation which produced Edison Swan lamps and so on to "Royal Ediswan" lamps. The second display pays tribute to the founder of the company, and by a cut-out map of the British Isles showing the location of all Ediswan factories and branches, emphasizes the claim of "100 per cent British" applied to all Ediswan goods. There is a complete list of the company's products, many of which are displayed or illustrated, together with photographs of factory interiors. These



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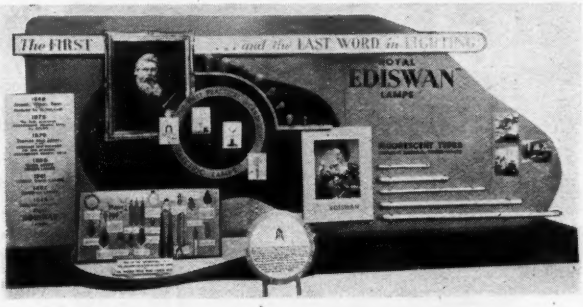

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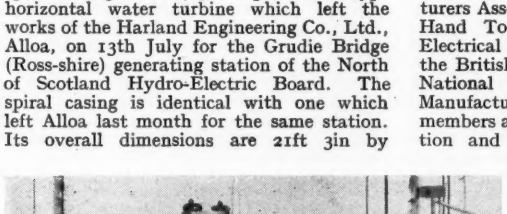
In the territory covered by the National Federated Electrical Association's Birming-

ham, Coventry, North Worcestershire and Staffordshire and South Staffordshire Branches, the Tuesday following August Bank Holiday Monday will comprise the sixth paid holiday, in substitution for Good Friday.

In most parts of the country August Bank Holiday Monday will be a paid holiday. Areas or places in which it is not a paid holiday are any area or place in which the Bank Holiday has not been customarily observed as a holiday in the electrical contracting industry, and areas or places for which the N.J.I.C. has ratified a "substituted" day to constitute the paid holiday.

Water Turbine Spiral Casing

The accompanying picture shows the spiral casing for a 17,300 h.p. Francis type horizontal water turbine which left the works of the Harland Engineering Co., Ltd., Alloa, on 13th July for the Grudie Bridge (Ross-shire) generating station of the North of Scotland Hydro-Electric Board. The spiral casing is identical with one which left Alloa last month for the same station. Its overall dimensions are 21ft 3in by 16ft 2in by 6ft, and it had to be dismantled after assembly to be taken north by road. The Board's Grudie Bridge power station is operated by water drawn from Loch Fannich and will be producing power next winter.



Casing for a large Francis water turbine for Grudie Bridge power station

Agencies in Sweden

The British Embassy in Stockholm invites United Kingdom manufacturers and exporters, who are not sure that their agency arrangements are known to its Commercial Department, to send brief particulars to the Counsellor (Commercial), British Embassy, Stockholm. The information will assist in answering inquiries from local firms anxious to obtain British goods.

Annual Holidays

The works and offices of Micramatic, Ltd., will be closed for the annual holidays from 12th to 22nd August.

The works of Bylock Electric, Ltd., will be closed for the annual holidays from 22nd July to 3rd August.

Canadian Exhibition Plans

A Canada Exhibition Committee has been formed by the Machine Tool Trades Association, the Gauge and Tool Makers Association, the Scientific Instrument Manufacturers Association, the Federation of British Hand Tool Manufacturers, the Portable Electrical Tool Manufacturers Association, the British Compressed Air Society and the National Federation of Engineers' Tool Manufacturers to plan on behalf of their members a comprehensive display of production and research at the third Canadian International Trade Fair to be held in June, 1950. It has been estimated that this display, to be known as the British Tool, Machine Tool and Scientific Instrument Section of the Fair, will require some 35,000 sq ft of stand space and the Canadian authorities have agreed to reserve a suitable area in the Automotive Building in Toronto.

The Committee at one time considered organizing an entirely independent exhibition in Canada, but came to the conclusion after investigation that the International Trade Fair run by the Canadian Government offered an opportunity which could not be improved upon. Started in 1948, the Fair has broken new ground in North America in introducing the trade fair as conceived and widely used in Europe. The second Fair held recently attracted nearly 30,000 trade buyers from 57 different countries including a thousand from the United States. The general public, admitted on three days out of the eleven, numbered 80,000. Some 60 per cent of the 1,500 exhibits this year came from outside Canada, the United Kingdom predominating with 200.

The Canada Exhibition Committee, of which Mr. W. J. Morgan, M.B.E., has been appointed organizing secretary, is housed

at the Machine Tool Trades Association offices, Victoria House, Southampton Row, W.C.2. The Committee has agreed, subject to space being available, to consider early applications from firms not in membership with one or other of the constituent associations but whose products are within the scope of the projected Tool, Machine Tool and Scientific Instrument Section.

Hoover Competition

The results of the window display contest organized by Hoover, Ltd., have now been announced. The first prize in Class A (Electricity Board showrooms) has been awarded to London Board showroom, Leyton, the second to N.W. Board showroom, Hyde, Ches., and the third to N.W. Board showrooms, Leigh, Lancs. In Class B (departmental stores and house furnishers), the first prize goes to Owen Owen, Ltd., Liverpool, who also receive the silver challenge cup for the best display in any class.

The winners of awards in Class C (electrical contractors and ironmongers) are: First prize, Barnes & Avis, Ltd., Reading; second, Weatherheads, Bletchley; and third, Dean & Noble, Ltd., Hyde, Ches. In addition a number of consolation prizes have also been awarded.

Lightweight Battery

Users of hearing aids are likely to be the first to benefit from the announcement by the National Carbon Co., New York, that a dry-cell battery has been devised which is of smaller volume than other commercial types. It weighs about an ounce and lasts 80 hours. Metal oxides are not used for depolarizing; instead a highly active carbon electrode takes up oxygen from the air when the battery is unsealed for use. A paste around the electrode holds the necessary electrolyte which, in effect, is regenerated to enable the battery to continue functioning until the pure zinc anode has been completely consumed in the chemical reaction involved.

Transformer Connections

In the article on "Trends in the United States" on page 113 of the *Electrical Review* of 15th July it was stated that "there is a trend towards the use of single-phase units." This should have read "there is a trend towards the use of single three-phase units rather than of four single-phase units (one being spare)." It is, of course, the use of the three-phase construction that has long been British practice.

Fluorescent Lighting Installation

For the lighting of the coffee room at the Anglo-Iranian Oil Company's premises at Beaufort House, Gravel Lane, E.C., it was desired to create a homely and comfortable atmosphere in contrast to the air of work and efficiency of the offices. This is achieved by an informal arrangement of the furniture coupled with colourful decorations and a background of flowers with warm pleasant lighting. This last amenity is provided by 61 Atlas "Domestic" fluorescent fittings used with the new Atlas "peach" coloured tubes. The result is a general illumination to an average of 9ft candles throughout the room. The Electrical contractors were Fred L. McGhee & Co., the fittings being supplied by Thorn Electrical Industries, Ltd.

Fluorescent lighting in the coffee room at the Anglo-Iranian Oil Company's offices

Fatalities

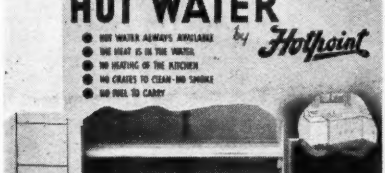
Accident at Colliery.—John Glendinning (24), an electrician, received a fatal electric shock while repairing a switch at West Wylam Colliery, Northumberland. An apprentice said that he filed the 600 V switch without knowing that it was alive. He then changed places with Glendinning, who closed the switch and received a fatal shock. Mr. W. Paisley, foreman electrician, agreed that Glendinning's method of working on the repair was contrary to rules. A verdict of "Accidental death" was recorded.

Faulty Fire.—Recording a verdict of "Death by misadventure" on a 2½-year-old boy at a Penistone inquest, the coroner said that when any electrical appliance

showed signs of defect it should be examined by a competent electrician. The bottom bar of the electric fire concerned, was broken in three places, and none of the wires of the flex was earthed.

Agricultural Display Units

The Hotpoint Electric Appliance Co., Ltd., has designed three display units which are being used in a number of agricultural shows this summer. Each unit is sectionalized so that it may be shown separately. The display unit shown in the


HOT WATER
by Hotpoint
HOT WATER ALWAYS AVAILABLE
THE HEAT IS IN THE WATER
NO HEATING IN THE KITCHEN
NO GRATES TO CLEAN - NO SMOKE
NO FUEL TO CARRY

Hotpoint water heating display unit

accompanying picture relates to Hotpoint water heaters. The largest of the three draws attention to the Hotpoint home laundry, and the third portrays some of the applications of "Torribar" heating elements.

Trade Announcements

The Electroplant Co., owned by G.P.U., Ltd., Palace of Engineering, Wembley, has accepted a tender for the erection of two single-storey buildings on the grounds adjoining its present works. The total area covered by the new buildings will be over 10,000 sq ft, and it is hoped that the extension will be ready for use within about four months.

Alstans Electrical, Ltd., have removed to 1047, Coventry Road, Hay Mills, Birmingham, 25 (telephone: Victoria 0841).

E. K. Cole, Ltd., announce that they have opened new premises in Glasgow which will house their Scottish radio service depot as well as the Glasgow depot, offices and showrooms of Ekco-Ensign Electric, Ltd. This follows the closing of the Ekco service depot at Rutherglen from which Mr. D. A. Nichol, depot manager, and his staff have already moved to the new address at 26, India Street, Glasgow, C.2 (telephone: Central 2012). Mr. K. T. B. Askins has been appointed Glasgow depot manager of Ekco-Ensign Electric, Ltd., taking over from Mr. A. C. Robertson, who is continuing to represent the company in the City and Greater Glasgow. E. K. Cole also plan to display the products of their heating (Thermovent) and plastics divisions at the India Street premises.

H. Fisher (Oldham), Ltd., have completed an entirely new layout with new machine tools, solely devoted to the mass-production of the "Cleanette" electric maid at their works at Pennant Street, Oldham. It is hoped to have the first mass-produced "Cleanettes" running off the assembly line by the middle of November next.

Bastian & Allen, Ltd., have acquired new premises at Harrow, Middlesex, close to Harrow and Wealdstone Station, which will enable the manufacture of electrode boilers, water heaters, etc., to be carried on under one roof. The new premises will also house the head office and technical departments. The London and Nottingham works and the present head office at Bedford Square will be closed as from 23rd July and the new works and offices will open on 25th July. The address will be: Ferndale Terrace, Harrow, Middx (telephone: Underhill 0440).

A new showroom has been opened by **Runbaken Electrical Products** at 45, Oxford Road, Manchester, 1, for the display of their test apparatus and other equipment.

The Hopkinson Electric Co., Ltd., has opened a new office at 97-99, Waterloo Street, Glasgow, C.2 (telephone: Central 2941). The office will be under the management of Mr. W. Murdoch, the Scottish sales engineer.

Clock Window Display Competition

A national window display competition for retailers is being organized by Smiths English Clocks, Ltd., during the month of October. The competition will be divided into two groups, the jewellery trade being represented in group A, and the electrical trade in group B. The prizes in each group are £50 first, £30 second, and £20 third, with ten consolation prizes of £5 each. The company will supply retailers with display material, and inquiries for this material should be addressed to the company's Advertising Department, 179, Great Portland Street, London, W.1. Entry forms can be obtained from the Publicity Department at the same address.

Electricity Supply

Generation in June : Weymouth Overhead-line Inquiry

THE total electricity generated in June by the power stations of the British Electricity Authority, the North of Scotland Hydro-Electric Board and the Lochaber Power Co. was 3,394 million kWh, as compared with 3,379 million kWh in June, 1948, an increase of 0.4 per cent. The increase for the first six months of this year, as compared with 1948, is 5.7 per cent.

In the week ended 8th July 710.2 million kWh was sent out for public supply from solid-fuel fired stations, as compared with 708.7 million kWh in the preceding week and 709.5 million in the week ended 9th July, 1948. Coal stocks at electricity undertakings at 9th July were 3,839,300 tons.

	Fuel consumed Thousand tons		kWh generated Millions			kWh sent out Millions	Installed capacity (m.c.r.) kW
	Coal	Oil	Steam	Water Power	Total*		
British Electricity Authority ...	2,005	2.3	3,286	15	3,313	3,112	13,117
North of Scotland	14	0.6	22	57	81	80	322
Total for June, 1949	2,019	2.9	3,308	72	3,394	3,192	13,439
Total for June, 1948	2,026	2.4	3,280	89	3,379	3,188	12,957
Per cent increase or decrease ...	−0.3	+20.8	+0.9	−19.1	+0.4	+0.1	+3.7
Total for January-June	14,566	25.5	23,929	649	24,677	23,286	—
Corresponding period, 1948 ...	14,112	20.1	22,611	657	23,345	22,034	—
Per cent increase or decrease ...	+3.2	+26.9	+5.8	−1.2	+5.7	+5.7	—

* Including generation by oil engines, refuse destructors and waste-heat plants amounting to 14.5 million kWh in June.

Weymouth Inquiry

Appeals against the county planning authority's decision to allow the erection of an overhead line through the Radipole Lake district into Weymouth were heard recently by Mr. H. W. Grimmitt, Ministry of Fuel and Power Inspector. Opposition to the proposals came from Weymouth Corporation and four other objectors. The Corporation's case was that development would be seriously affected, the land would depreciate in value and the amenities would be marred, but in answer to a question the town clerk was unable to say when the development was likely to take place. Mr. R. Halsall (B.E.A.) said it was proposed to run a line from Winterborne Abbas substation to Chaffey's Lake, Weymouth, then connecting with the Weymouth electricity station. The line was required to reinforce supplies to Weymouth and the surrounding district. There would be four towers on Corporation land. Altogether the line would cross the property of 16 owners, 11 of whom had consented, and of 12 occupiers affected 11 had agreed to the erection of the towers. To run the line underground would cost £36,550 per mile, £22,250 more than overhead. For the Corporation's property alone the additional cost would be £14,350.

Malvern Hills Amenities

A new proposal by the Midlands Electricity Board for an overhead line on the Malvern Hills came before the Conservators last week. The chairman wrote stating that the Electricity Board had been endeavouring to solve the problem of affording an additional supply in Herefordshire, while having regard for the amenities of the Malvern Hills and also taking into account the engineering and financial side of the problem. The Board had concluded that the only practical method was the construction of a supplementary 66 kV line to link with the existing overhead network. In view of the representations made it was proposed to use wooden pole supports instead of steel towers, although this would reduce the capacity by about a half. The Conservators decided to reply that they did not wish to obstruct the provision of an additional electricity supply to Herefordshire, but strongly objected to overhead lines on Malvern Hills.

Ledbury Rural District Council has agreed to the Board's proposal (so far as the area under its control is concerned) "in view of the great need for electricity in rural Herefordshire."

London Consultative Council

In a statement last week on the work of the London Electricity Consultative Council the chairman said that in pursuance of Section 7(9) of the Electricity Act, 1947, the Council proposed to establish District Committees for each of the seven Sub-Areas of the London Electricity Board. A scheme for this purpose had been prepared by the Council and had received the provisional approval of the Minister of Fuel and Power. Nominations for these committees had

been requested and it was hoped that their formation would be carried out in the near future. The date for the next public meeting of the Council has been fixed for 13th October.

Centenary Illuminations

Oldham Corporation is considering a scheme of illuminations for next winter, as part of the town's centenary celebrations.

Mercury Lighting Chosen

After experiments with various types of street lighting, the Smethwick Town Council has decided to accept a quotation by the Midlands Electricity Board for mercury vapour discharge lamps at nineteen points in Bearwood Road. Councillor H. G. Pinner, who failed in an attempt to refer the recommendation back, questioned the suitability of mercury vapour lighting which, he said, he had been assured by experts was "on its way out."

Estate Lighting

Subject to the receipt of the necessary loan sanction the borough surveyor of Walsall is to arrange for the provision of additional street lighting on various Council estates at an estimated cost of £8,155.

Accidents in the Home

CAUSES OF ELECTRICAL MISHAPS ANALYSED

RECORDS of accidents of all kinds that occur on domestic premises kept for the information of an Interdepartmental Committee of the Home Office include particulars compiled by an Electrical Sub-Committee of mishaps resulting from the household use of electricity.

The second classified précis of domestic accidents due to this cause, issued by Mr. H. W. Swann, shows that there were 68 fatalities in the year 1948 compared with 31 during eight months of 1947.

It is reassuring to note that, of the total, only three were attributed to faulty wiring; one was due to insulation breakdown making "alive" the lead sheathing of the wiring system, another to a faulty metal push-bar lampholder, and in the third case a child died after being burned in a fire caused by faulty lighting flex erected by the non-technical occupier of a cottage.

Electrically-operated tools caused four deaths, and six fatalities occurred in bathrooms (in one of which a fire was involved), while eight deaths resulted from the use of irons, kettles, etc.

Electric fires were blamed for 21 fatalities, or 30.88 per cent of the total. Three of these were fatal shocks and the other 17 deaths followed burns.

Of the 26 deaths classed as miscellaneous, representing 38.23 per cent of the total, three were attributed to electric blankets, two to adjacent gas/electricity services, and four were caused by radio sets.

Among the more uncommon kinds of accident was the case of a keen gardener who, wishing to prevent prowling cats from damaging his plants, fixed up a rough network of single-strand wire as a guard. He connected it at night to a lighting point in the house (a.c. 230V) and usually disconnected it in the morning before he went to work because he "thought it might be harmful to the children playing in the garden," although he estimated the shock risk was "only a sting." One day he returned home to find his wife lying dead in the garden, across the "live" cat guard.

There have been a number of fires in prefabricated houses in circumstances which are difficult to explain after the event. Mr. Swann reports the death of a small child in an aluminium house which was totally destroyed. Expert examination of what was left of the electrical installation disclosed evidence that the fire was probably caused by an earth fault on the wiring which was not cleared by the fuses (found intact) because either "they" were in the neutral conductor or high resistance of the earth-return path limited the fault current to a value that was insufficient to "blow" the fuses.

European Power Supply

ONE of the most recent publications of the British Electrical and Allied Industries Research Association deals with the supply of electrical power to the central European area by means of high voltage d.c. transmission. This report (Ref. Z/T78), which has been prepared by A. Menge and by Dr. Ing. F. Busemann, is a shortened version of a paper read in Germany in 1947. It provides an historical review and comparison on both economic and technical grounds of a.c. and d.c. transmission at high voltages including a full description of the Elbe-Berlin line (100 MW 400 kV d.c.) and envisages an extensive European network.

The report is available from the Association at Thorncroft Manor, Dorking Road, Leatherhead, Surrey, price 15s (postage 3d).

Road Transport

RECENT DEVELOPMENTS UNDER THE 1947 ACT

By GRAHAM SAVILLE

ELECTRICAL concerns will have found that while many of the changes provided for under the Transport Act, 1947, have already taken place, most of these have had little effect upon their own businesses. Nationalization of railways and inland waterways has so far brought about little alteration in the method by which traffic is handled. Some changes in the method of liaison with traders and in the style of the various officers have been introduced, but these have caused little concern to traders.

The taking-over of long-distance road haulage is proceeding steadily. No date has as yet been laid down for the appointed day after which it will not be possible for road haulage firms not taken over by the British Transport Commission to operate outside a 25-mile radius from their operating centres except under a permit, but the regulations outlining the procedure for original permit applications have been detailed. These regulations are contained in two Statutory Instruments, the Goods Vehicles (Applications for Original Permits) (Appointed Day) Order, 1949, and the Goods Vehicle (Permits) Regulations, 1949.

Effect of Regulations

The importance of these regulations to electrical concerns is that their employment of haulage contractors in many instances is restricted to those who have availed themselves of the protection afforded them under the Transport Act. Under these original permits an undertaking is permitted to operate as if the application has been granted until one month after the application has been dealt with by the Road Haulage Executive or until one month after the appointed day for the 25-mile restriction. The later date of these two is the one which applies.

In making an application for an original permit, the following details as to the nature of the work have to be specified:—

(1) Particulars of the goods to be carried and the approximate tonnage.
(2) The points between which the goods are to be carried and the frequency of the journeys where regular services are operated. In other cases the areas or districts served have to be shown.
(3) Where it is desired to use any particular vehicles in connection with particular work the index numbers and registrations of these vehicles have to be given together with the number of trailers, if any.

Where an original permit is granted it continues to operate during the currency of the relative carrier's licence unless it is revoked at the end of the first or fourth years or any third year period thereafter. In addition it can be revoked or suspended by a Licensing Authority for a serious breach of any condition of the permit or licence.

Haulage contractors will be permitted to apply for other forms of licence to enable them to carry traffic beyond the 25-mile radius, but these will not come into prominence until the appointed day has been fixed. It has been indicated that it is unlikely that the appointed day will fall into the current year.

Road Haulage Organization

The territory covered by the Road Transport Executive, now the Road Haulage Executive, has been split up into divisions—Southern, North-Eastern, North-Western, Midland, Eastern, Western, South-Western and South-Eastern. Each is under the control of a divisional manager. The divisions are then sub-divided into districts, under district managers, and the districts are then divided into groups, consisting of a number of units, under the control of a group manager. The average strength of the groups will be about 120 vehicles, but it is probable that there will be

considerable variation in this number.

Although many firms have already been transferred to the Road Haulage Executive, and there have been a few rates alterations, generally the charges and methods of operation of the concerns taken over are being continued.

It will be appreciated that the Road Haulage Executive has been set up to take over long-distance road haulage, but in actual practice it will also undertake a considerable amount of short-distance work.

Whilst, as already mentioned, the developments with regard to rail transport have not had an appreciable effect on the transport arrangements of electrical concerns, there are some indications of changes which are likely to be of considerable importance to them. The standardization of practice regarding such matters as commuted claims agreements and agreed charges must be watched by individual concerns with particular care. It is already apparent that the Railway Executive is concerned with the loss of revenue and is prepared to meet traders and to retain rail traffic by making suitable concessions. Moreover staff has been appointed to deal with matters of concern to traders. Many of these "service representatives" cover particular fields.

The Transport Act provides for the setting up of consultative committees and the Central Transport Cosultative Committee has now been appointed.

The British Transport Commission has to submit to the Transport Tribunal draft schemes for charges and conditions of carriage in respect of traffic which it handles. The schemes were to have been submitted to the Transport Tribunal within two years of the passing of the Act, i.e., August, 1949, but the Commission could apply for an extension of the period and it is understood that this has been done. Nevertheless it has been stated that there will be no undue delay in the submission of draft schemes.

Southern Rhodesian Imports

THE electrical import trade of Southern Rhodesia last year increased in all items save some unspecified machinery. A feature generally was the strengthening hold of the Union of South Africa in contrast to the lessening participation of the United States The Government of Southern Rhodesia plans during the next four years many developments which should favourably influence the market for electrical goods.

Class of Goods and Supplying Countries	1948 £(000)	Inc. or dec. on 1947
Batteries	126	+ 22
From United Kingdom	62	+ 19
,, *South Africa*	58	+ 20
Motors and parts	151	+ 58
From United Kingdom	120	+ 46
,, *South Africa*	18	+ 14
,, *Sweden*	5	+ 3
,, *United States*	6	— 4
Transformers	139	+ 40
From United Kingdom	124	+ 37
,, *South Africa*	12	+ 5
,, *United States*	2	— 3
Other elec. machinery	221	— 22
From United Kingdom	170	— 27
,, *South Africa*	22	+ 13
,, *Belgium*	7	+ 7
,, *United States*	21	— 15
Elec. cable and wire	627	+ 256
From United Kingdom	456	+ 216
,, *South Africa*	137	+ 41
,, *United States*	27	+ 24
Lamp bulbs	66	+ 19
From United Kingdom	47	+ 7
,, *South Africa*	19	+ 12
,, *Holland*	6	+ 5
,, *United States*	6	— 4
Telegraph and telephone material and implements	255	+ 158
From United Kingdom	248	+ 154
,, *United States*	6	+ 4
Radio material	176	+ 89
From United Kingdom	130	+ 71
,, *South Africa*	41	+ 21
,, *United States*	2	—
Elec. stoves, ranges and parts	134	+ 92
From United Kingdom	86	+ 86
,, *Canada*	33	+ 12
,, *South Africa*	8	+ 8
,, *United States*	6	+ 3
Other elec. heating and cooking apparatus	135	+ 12
From United Kingdom	93	+ 7
,, *South Africa*	31	+ 24
,, *United States*	8	— 9
Other elec. goods and apparatus	468	+ 243
From United Kingdom	329	+ 190
,, *Canada*	25	+ 20
,, *South Africa*	63	+ 22
,, *United States*	42	+ 4

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

Scottish Cables, Ltd., reports a trading profit for the year ended 30th April last of £254,060, as compared with £208,235 for the preceding year, and after providing for depreciation, £23,900, auditors' remuneration, £253, and taxation, £125,085, there is a balance of £104,822 (against £66,388). To this is added £35,011 brought in, making £139,833 available. General reserve receives £76,058, and the ordinary dividend for the year is maintained at 30 per cent, less tax, by a final payment of 20 per cent. The balance carried forward is £17,575.

In his statement which accompanies the report and accounts, Mr. W. Fraser (chairman) says that during the year under review approximately 30 per cent of their business was for overseas markets. In addition to the general business, important power distribution cable contracts were executed and many new contracts of this kind entered into for different countries throughout the world. Competition is steadily becoming more acute, however, firstly from foreign countries, secondly from countries becoming self-industrialized, and to which must be added the embargo which has been placed on imports by different countries, this especially applying at the present time to South Africa. To cope effectively with foreign competition it is important that the selling price must be right and this is controlled by costs. It is imperative that manufacturers in this country should not pay more for their raw materials than manufacturers abroad. The volume of orders now on the company's books represents an increase of 60 per cent as compared with last year. To meet expansion of business a small factory has been leased near the main works.

Ferranti, Ltd.—An extra-ordinary meeting will be held on 8th August at which resolutions will be submitted for increasing the capital of the company to £2,500,000 by the creation of 1,000,000 5 per cent second redeemable cumulative preference shares of £1 each and 1,200,000 ordinary shares of 10s each, the capitalization of £700,000 of the general reserve, and the conversion of all shares as and when they are issued and fully paid, into stock. It is proposed to distribute free 500,000 of the new preference and 400,000 ordinary shares to ordinary stockholders in the proportion of five preference and four ordinary for every £3 of stock held. In a circular to stockholders, Sir Vincent de Ferranti (chairman) says that it is anticipated that a proportion of the 5 per cent second redeemable cumulative preference shares now proposed to be issued will in due course be made available to the public for purchase, when application for permission to deal in the whole of the second preference shares on the London and Manchester Stock Exchanges will be made.

R. A. Lister & Co., Ltd., have decided to issue the 100,000 ordinary shares of £1 each, authorized but not yet issued, at 65s per share by way of rights to ordinary stockholders in the proportion of one new ordinary share for every £12 or ordinary stock held. When this issue has been completed, the company's share capital will consist of £1,300,000 ordinary stock and £300,000 6 per cent preference stock. The directors have also decided to recommend that sufficient of the company's reserves be utilized subsequently for the purpose of issuing a capital bonus of £1 ordinary stock for every £1 of ordinary stock held. The consent of the Treasury has been received to both of these operations. An extra-ordinary meeting will be held on 26th August at which the necessary resolutions will be submitted increasing the authorized capital by the creation of an additional 2,000,000 ordinary shares of £1 each to cover the proposed bonus issue, and to facilitate the provision of any future capital requirements.

The Telegraph Construction & Maintenance Co., Ltd., has received the consent of the Treasury to increase its nominal capital to £1,500,000 and to capitalize £195,409 of its share premium reserve, to be applied in paying up an equivalent amount of ordinary shares. The new shares are to be issued to shareholders as a bonus in the proportion of one new share for every four held.

The company has declared an unchanged interim dividend of 5 per cent, actual, less tax.

Richardsons, Westgarth & Co., Ltd., report a net profit for the year ended 31st March last of £169,302, as compared with £161,981 for 1947-48. It is proposed to pay a dividend of 10 per cent, less tax, for the year. In the previous year the dividend was 8 per cent, less tax, plus a special distribution of 2 per cent, tax free, from capital reserve.

Parmiter Hope & Sugden, Ltd., are paying a dividend for the year of 50 per cent (against 30 per cent) which includes a jubilee bonus of 20 per cent.

The General Electric Co., Ltd., has placed privately, through Morgan Grenfell & Co., Ltd., £8,000,000 of 3½ per cent 10-year unsecured loan stock at the price of 99 per cent. The proceeds of the issue will

be used for the general purposes of the company and for repaying bank loans which were obtained for the development of the business.

Aron Electricity Meter, Ltd., reports a profit for the year ended 31st March last of £45,169, and after providing for taxation £30,506, and loss of subsidiary £697, there is a balance of £13,966 (against £27,289). The dividend for the year is unchanged at 15 per cent, and £26,929 is carried forward (against £25,498 brought in).

Bennis Combustion, Ltd., proposes to pay a final ordinary dividend of 10 per cent, making 15 per cent, less tax, for the year (against 12½ per cent).

The Globe Telegraph & Trust Co., Ltd., reports a net profit, after taxation, for the year ended 30th June, of £185,484, as against £191,329 for the previous year. The final dividend is 2 per cent, maintaining the distribution for the year at 5 per cent.

New Companies

Dawson-Keith, Ltd.—Registered 11th June. Capital £100. Manufacturers and repairers of and dealers in dynamos, motors, armatures, magnetos, batteries, conductors, insulators, transformers, etc. Directors: S. D. Burton and Mrs. Marjorie M. L. E. Burton. Secy.: B. Friend. Regd. office: 16, Rood Lane, Eastcheap, E.C.3.

Dawkins & Richardson Engineering Co., Ltd.—Registered 21st June. Capital £500. Motor and electrical engineers and general electrical installation contractors, etc. Directors: T. Dawkins and H. E. Richardson. Secy.: H. E. Richardson. Regd. office: Harlow Road, Moreton, nr. Ongar, Essex.

Lansdowne Electric, Ltd. — Registered 22nd June. Capital £1,000. Manufacturers, repairers and dealers in artificial lighting apparatus, electrical and gas plant, fittings and accessories, etc. Permanent directors: F. W. Blanshard, A. Blanshard and J. L. Richards. Secy.: John L. Richards. Regd. office: 23, Lansdowne Road, Purley, Surrey.

K. W. Hawes (Electrical) Co., Ltd.—Registered 22nd June. Capital £1,000. Mechanical, general and electrical engineers and contractors, television engineers, etc. Directors: K. W. Hawes and Vera Wade. Secy.: Vera Wade. Regd. office: 21a, Barnsbury Park, N.1.

Loft Wholesale, Ltd.—Registered 22nd June. Capital £1,000. To acquire the business carried on by J. Stanloft as "Loft Wholesale" at 42, Thomas Street, Manchester, and to carry on the business of manufacturers and distributors of and dealers in electrical goods, wireless and television sets, etc. Directors: J. Stanloft and Betsy Steinloft. Secy.: J. Stanloft Regd. office: 42, Thomas Street, Manchester, 4.

L. E. Simmonds, Ltd.—Registered 23rd June. Capital £1,000. Wholesale and retail merchants, manufacturers, agents and dealers in wireless apparatus and electrical instruments and accessories, etc. Directors: L. E. Simmonds and R. Simmonds. Secy.: R. Simmonds. Regd. office: 1, Quality Court, Chancery Lane, W.C.2.

Increases of Capital

Dynamo & Motor Repairs, Ltd.—Increased by £90,000, in £1 ordinary shares, beyond the registered capital of £10,000.

Cape Electric Tramways, Ltd.—Increased by £150,000, in £1 ordinary shares, beyond the registered capital of £600,000.

R. Hambley (Electrical), Ltd.—Increased by £400, in £1 ordinary shares, beyond the registered capital of £100.

Hindle Smart & Co., Ltd.—Increased by £5,000, in £1 shares, beyond the registered capital of £600.

Rotomix Engineering, Ltd.—Increased by £1,000, in £1 ordinary shares, beyond the registered capital of £2,000.

Ross Courtney & Co., Ltd.—Increased by £64,000, in £1 shares, beyond the registered capital of £36,000. Southern Areas Electric Corporation, Ltd., were allotted 50,898 shares on 18th May.

Broadcast Relay Service (Overseas), Ltd.—Increased by £600,000, in 4s ordinary shares, beyond the registered capital of £600,000. on 28th June, 1948, Broadcast Relay Service, Ltd., held 742,498 ordinary shares of 4s each.

Electroflo Meters Co., Ltd.—Increased by £50,000, in 10s shares, beyond the registered capital of £21,000.

Liquidation

North London Ceramics, Ltd.—Winding up. Joint liquidators, Mr. W. English, 211, Lower Addiscombe Road, Croydon, and Mr. P. J. Snow, 17, Albion Street, Hanley, Stoke-on-Trent.

Bankruptcies

G. L. Barber, 19, St. Albans Street, Weymouth, electrical contractor and radio engineer.—Trustee, Mr. C. Wild, 22, High Street, Dorchester, appointed 12th July, 1949.

L. A. Batchelor, trading as Kenex Distributors, at 139, Bohemia Road, St. Leonards-on-Sea, electrical and radio equipment wholesalers.—Last day for receiving proofs for dividend 29th July. Trustee, Mr. A. E. Orbell, 6 & 7, Old Steine, Brighton, 1.

STOCKS and SHARES

STOCK EXCHANGE markets are never particularly active during the summer months, and, accordingly, the present lacklustre condition of business is normal enough, although the inclination is to debit to-day's want of activity to political and domestic factors. There is little going on in most of the markets. It takes but a small offering of stock, or bidding for it, to bring about abrupt and spasmodic price fluctuations. It is known that many offerings of new stock are resting in the pigeonholes of promoters and others, awaiting a favourable opportunity for seeking the support of the public, which support, however, cannot be relied upon to the same extent to-day as a few months ago.

General Electric Loan Stock

Instead of making a public issue, the General Electric Co., Ltd., has just placed privately £8,000,000 of 3½ per cent 10-year unsecured loan stock at 99 per cent, the money being required for the general purposes of the company and for repaying bank loans. In the report for last year, bank loan figured at £4,821,000. The report stated that to a large extent this had been reduced, but added that further finance would be required. The price of the shares is a little better at 82s.

Ferranti Bonus

Ferranti, Ltd., proposes to capitalize £700,000 from the general reserve fund, and to increase the capital to £2½ million by creating 1,000,000 second redeemable preference £1 shares and 1,200,000 ordinary shares, distributing, free, half the preference and 400,000 10s ordinary shares to ordinary stockholders. The price of the existing 7 per cent preference shares is 33s: the ordinary shares are all held privately. It is expected that the new second preference will come to market in due course. For years past Ferranti has paid an annual dividend of 6 per cent, tax free, on the ordinary shares, out of considerably higher earnings.

Enfields and Babcocks

Enfield Cables' offer of new shares, by way of "rights," at 27s 6d, closed on Thursday this week, as did the opportunity to apply for further ordinary and the new 4½ per cent second preference shares. On Babcock & Wilcox's new ordinary shares, the first call of 20s is due on acceptance by the last Friday in this month. The final payment of 37s 6d has to be paid a month later. It will be open to shareholders to renounce their allotments up to 19th August in the case of Enfields, and until 23rd September for Babcocks. Meanwhile, the shares will be available free of transfer stamp to the buyer. Both companies referred in their circulars to continuously good business. At 28s 6d and 58s respectively, the shares pay in each case comfortably over 5 per cent at the 1948 rate of dividends.

Telegraph Construction Bonus

Telegraph Construction £1 ordinary shares rose ⅛ to 48s 9d on the proposal of a free one-in-four share bonus. This is a straightforward capitalization of reserves; and while the operation is satisfactory in its effect on the balance sheet, the market does not jump on these occasions to conclusions in connection with the dividend. Distinctions between the various kinds of bonus have become more generally appreciated. In cases where new money is involved, such as the recent Johnson & Phillips' issue, or the offer of shares as "rights," on bonus terms, there is often a fair assumption that former dividend rates will be maintained on the larger capital, from the earnings of the additional funds. But when Vickers, for instance doubled the nominal capital out of reserves, they were careful to remove possible illusions about any resultant change in the amount likely to be distributed in future.

The Week's Price Fluctuations

Metal Industries' "B" shares at 41s 3d are 4s 3d higher, Joseph Lucas at 72s 6d have gained 2s 6d, and improvements of 1s 3d made Hoovers 28s 9d, Revo 48s 9d, Murex 95s, De la Rue 27s 6d, and Pye 26s 3d. On the other hand, Vactric, at 17s 6d, are ⅛ lower, Falk Stadelmann at 41s 3d have lost 2s 6d, and Ward & Goldstone at 50s are 5s down. Cable & Wireless ordinary at 231½ is a point higher. B.E.T. deferred rose 10 to 158⅝.

Radio Share Activity

Decca 1s shares have been moving strongly against the stream: the present price of 16s 3d compares with 12s 9d a fortnight ago. Of the company's several branches of activity, it seems that both the records section and the radar side of the Navigator subsidiary are responsible for this latest movement; and that developments in the American market may have revived interest in the shares from that quarter. The financial year ended in March. Two interims have been maintained at a total of 41.6 per cent. In February, the directors forecast results as favourable as those for 1947/8. On that year's distribution of 112½ per cent, the yield on the shares is a little over 6¾ per cent.

Trade With Finland

OPPORTUNITIES FOR BRITISH MANUFACTURERS

OF electrical machinery, appliances, material and components to the value of 1,250 million finmarks (£=547 finmarks) imported into Finland during the first nine months of 1948 the United Kingdom was responsible for 389.4 million finmarks. For the whole of 1947 the corresponding figures were 1,135.8 million fmks and 288.3 million fmks, while in 1939 (when £=227 fmks) the figures were 451.7 million fmks and 15.3 million fmks. In 1947 imports of electrical machinery alone totalled 331 million fmks in value, of which the United Kingdom supplied 116.1 million fmks' worth. The United Kingdom also supplied 16.9 million fmks of the 20 million fmks' worth of metal sheathed cables.

Hydro-Electric Projects

Giving these figures, an overseas economic survey of Finland, published by the Board of Trade (H.M. Stationery Office, 2s) says that imports have consisted mainly of heavy generating equipment required for the country's programme of hydro-electric expansion. Had delivery times quoted by manufacturing countries been shorter, greatly increased imports would have been shown. Imports are likely to be on a heavy scale for several years to come, under contracts already placed: these include several important contracts with United Kingdom firms. As Finland intends to continue to develop her hydro-electric resources it is likely that further important contracts will be placed in the next few years. Heavy generators are also manufactured locally, but the scale of production is not yet sufficient to cover the expanding demand. Electric motors are also being imported in fairly large numbers. Imports of electric cables are likely to decrease as local production should be sufficient to cover the demand now that cables need no longer be delivered as reparations.

Of local industry the report states that, in terms of output in kW of finished machines, the capacity of Oy Strömberg Ab, the principal concern manufacturing heavy electrical equipment, is now more than four times what it was in 1938. This concern is now building large generators of its own design required for some of the new power stations. Because of the pressure of reparations work, delivery periods are very long. The same firm also manufactures electric motors of all sizes, together with transformers and switchgear and a variety of domestic electrical appliances, all of its own design. Domestic appliances are also manufactured by a number of smaller concerns. In addition, Finland has large factories for making electrical cables and all kinds of electrical wires, incandescent lamps and electrical porcelain.

Finland lost one-eighth of her telephone and telegraph lines as a result of the war, but subsequent development has been substantial. In 1944 trunk lines comprised 190,660 km, and at the end of 1947 this figure had risen to 232,000 km. During the war it was not possible to extend the telephone exchanges in the principal towns, which are virtually all of the automatic type. Considerable orders for new equipment have, however, been placed abroad in the past year or two, notably in Sweden. At the end of 1947 there were about 280,000 telephone subscribers in Finland, representing a density of 6.9 subscribers per 100 inhabitants. Finland ranks as eleventh nation in the world in this respect. Telephone traffic is still maintained partly by the State and partly by private telephone companies, but the nationalization of the entire system is still under consideration. The telegraph network has been extended since the war. Teleprinters are used in the more important towns.

Malayan Refrigerator Market

A PROMISING market in Malaya awaits United Kingdom manufacturers who can supply domestic refrigerators of the right types at competitive prices, according to a report by the U.K. Trade Commissioner at Singapore. In 1948 imports of electric refrigerators amounted to 5,619 units valued at $ (St) 2,953,672: of these the United States supplied 5,363 units valued at $ (St) 2,824,812, and the United Kingdom 236 units valued at $ (St) 112,678.

The 1949 programme envisages the continued import of electric refrigerators from the United States, but British models of the right type now appear to be coming forward, and if firms make an effort to supply them at the right prices and in sufficient quantity they have an excellent chance to increase their share of the market. The sizes in demand are 3-4 cu ft, 6-9 cu ft, and 11-15 cu ft, of which the most popular range is 6-9 cu ft, with the strongest preference for a model of about 7½ cu ft. Only electric refrigerators with sealed units are suitable, and all the leading makers provide a 5-year guarantee.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1943

21166. British Thomson-Houston Co., Ltd.—Apparatus for starting discharge lamps. 24th December, 1942. (625,648.)

1944

10079. Sylvania Electric Products, Inc.—Apparatus for sealing a mount in the end of a tubular glass envelope. 25th April, 1941. (625,409.)

12474. Watson, F. (Aktiebolaget Elektrolux).—Washing machines. 30th June, 1944. (625,410.)

26080. British Thomson-Houston Co., Ltd.—Generators for engine testing. 31st December, 1943. (625,564.)

1945

11004. British Thomson-Houston Co., Ltd.—Welch, D. F., and Coe, R. T.—Electrical ignition systems for internal-combustion engines. 1st May, 1945. (625,650.)

12997. General Electric Co., Ltd., Dovey, D. M., and Williams, S. V.—Production of malleable iron. 24th May, 1945. (625,725.)

17317. Mozzanini, G. G., and Lebertre, M.—Speed control of direct-current motors by varying the energizing of the shunt field. 15th December, 1941. (625,565.)

17516. General Electric Co., Ltd., and Boyland, D. A.—Mounts for refractory incandescent elements. 9th July, 1945. (625,651.)

32544. Sperry Gyroscope Co., Inc.—Electrical computing devices. 30th November, 1944. (625,661.)

1946

697. British Thomson-Houston Co., Ltd.—Magnetic recording and reproducing of sound or similar vibrations. 9th January, 1945. (625,485.)

1722. Marconi's Wireless Telegraph Co., Ltd.—Circuits for producing electrical currents of sawtooth waveform. 18th January, 1945. (625,729.)

2489. Submarine Signal Co.—Frequency regulators. 16th February, 1945. (625,566.)

5052. Schneider, J., and Schneider, H.—Electric welding machines for welding feet to dial plates, letters, and the like. 18th February, 1946. (625,668.)

5835. Sperry Gyroscope Co., Inc.—Electrical positional control systems. 20th June, 1942. (625,567.)

9133. Gostkowski, B. H.—Motor for electromechanical razors. 26th March, 1945. [Cognate Applications 9134/46 and 9135/46.] (625,419.)

10789. Marconi's Wireless Telegraph Co., Ltd.—Radio and like relay systems. 9th April, 1945. (625,486.)

13001. National Cylinder Gas Co.—Welding electrodes. 3rd May, 1945. [Cognate Application 13002/46.] (625,424.)

13922. Vermeiren, T.I.S.—Electric device to prevent the formation of calcareous incrustations and dislodge those already existing. 6th October, 1945. (625,832.)

16253. Marconi's Wireless Telegraph Co., Ltd.—Radio relaying. 6th February, 1945. (625,488.)

17077. Igranic Electric Co., Ltd.—Control of electric motors. 21st June, 1945. (625,573.)

17144. Marconi's Wireless Telegraph Co., Ltd.—Intermediate frequency amplifiers. 6th June, 1945. (625,733.)

17204. British Thomson-Houston Co., Ltd.—Precision frequency meters. 9th June, 1945. (625,428.)

17268. Standard Telephones & Cables, Ltd.—Radio-location indicating system. 30th June, 1945. (625,734.)

17943. Western Electric Co., Inc.—Apparatus for the summation of vector quantities. 30th June, 1944. (625,430.)

19421. Philips Lamps, Ltd.—Means for automatically regulating the terminal voltage of a load. 15th November, 1941. [Cognate Application 19422/46.] (625,736.)

19802. Smith & Sons (England), Ltd., S., and Worster, N. G.—Electric generators. 2nd July, 1946. (625,575.)

20007. Philips Lamps, Ltd.—Frequency-modulated carrier systems. 6th July, 1942. (625,737.)

22189. British Thomson-Houston Co., Ltd., and Maggs, A. H.—Control systems for direct current motors. 25th July, 1946. (625,740.)

22987. Carnegie-Illinois Steel Corporation.—Contact roll for electrolytic treatment of metallic strip. 7th March, 1946. (625,435.)

23435. General Electric Co., Ltd., Garthwaite, F. N., Wilson, E., and Read, C. W. M.—Tuning devices for radio receivers and the like. 7th August, 1946. (625,436.)

29362. Standard Telephones & Cables, Ltd., Cragg, W. D., and Gayford, M. L.—Microphones. 2nd October, 1946. (625,743.)

29363. Standard Telephones & Cables, Ltd., Cragg, W. D., and Gayford, M. L.—Microphones. 2nd October, 1946. (625,744.)

31670. Brush Electrical Engineering Co., Ltd., and Banks, J. W.—Turbine blades. 25th October, 1946. (625,693.)

32831. Marconi's Wireless Telegraph Co., Ltd.—Means for tuning angle-modulated carrier wave receivers. 6th November, 1945. (625,449.)

37148. Watson, F. (Reymersholms Gamla Industri Aktiebolag).—Electrolytic production of metals. 17th December, 1946. (625,585.)

37517. Dubilier Condenser Co. (1925), Ltd. (Dubilier W.).—Apparatus for testing electrical insulating material—20th December, 1946. (625,459.)

1947

1895. British Thomson-Houston Co., Ltd., Stanworth, J. E., and Dale, A. E.—Glass compositions. 21st January, 1947. (625,466.)

2317. De Hoop N. V., A.—Electric direct-current equipment for motor-driven coastal craft. 4th May, 1943. (625,467.)

3022. Hall, Ltd., J. & E., and Elvy, S. T.—Escalators and the like. 31st January, 1947. (625,754.)

3887. English Electric Co., Ltd., Ferguson, J. M., and Ryder, D. H.—Electrical impulse voltage generators.—10th February, 1947. (625,590.)

4642. Jeffrey Manufacturing Co.—Electric control or switch devices for indicating a particular level of material in a container. 12th September, 1945. (625,470.)

7814. Standard Telephones & Cables, Ltd.—Multichannel radio systems for communication with moving vehicles. 28th March, 1946. (625,478.)

10268. Philips Lamps, Ltd.—Indicating devices for radio receivers and the like. 12th August, 1944. (625,785.)

10544. Ericsson Telephones, Ltd., and Drysdale, L. H.—Automatic telephone systems. 21st April, 1947. (625,704.)

10864. General Electric Co., Ltd., and Dunham, C. R.—Electric-discharge tube apparatus. 23rd April, 1947. (625,706.)

10866. General Electric Co., Ltd., and Stenning, L. C.—Electrical signalling systems. 23rd April, 1947. (625,483.)

11010. General Electric Co., Ltd., and Brown, E. P.—Electric switches having arcing horns. 24th April, 1947. (625,597.)

11507.—Wild-Barfield Electric Furnaces, Ltd., and Misra, R. A. P.—Air-conditioning apparatus. 29th April, 1947. (625,786.)

11934. Peirce, A. G., and Peirce, W. T.—Identification clip for electrical fuses. 2nd May, 1947. (625,708.)

12727. Taylor, A. E.—Electric lighters more particularly for use in lighting gas fires, cookers, and the like. 12th May, 1947. (625,712.)

15163. Smart & Brown (Engineers), Ltd., Spivey, W. H., and Stevens, B.—Contact members for the sockets of an electric plug-and-socket connection. 9th June, 1947. (625,719.)

15364. Triggs, W. W. (Caterpillar Tractor Co.).—Cable control unit for winding cables on tractors and like vehicles. 11th June, 1947. (625,611.)

15676. Radio Corporation of America.—Phase shifting or phase modulating circuit arrangements. 13th June, 1946. (625,791.)

15823. Commercial Secretaries, Ltd., Fairfield, R. M., and Dixon, N.—Flexible electric power cables. 16th June, 1947. (625,613.)

20199. Flight, T. N., Wilson, W. H., and Chinn, A. J.—Magnetic snap-action switches. 26th July, 1947. (625,492.)

20269. Standard Telephones & Cables, Ltd.—Radio communication selective call system. 1st September, 1945. (625,623.)

20801. Westinghouse Electric International Co.—Gas turbine apparatus. 26th September, 1946 (625,802.)

20988. Western Electric Co., Inc.—Electrical resistive elements and methods of making them. 19th September, 1942. (625,501.)

20990. Western Electric Co., Inc.—Coupling networks. 18th March, 1942. (625,722.)

20998. Carr Fastener Co., Ltd., and Clark, G. W.—Electrical contacts or connectors. 1st August, 1947. (625,502.)

21060. Bunn, E. W., and Wright, W. J.—Means for illuminating vehicles with electric-discharge lamps. 1st August, 1947. (625,504.)

21099. British Thomson-Houston Co., Ltd.—Alternating-current motors. 2nd August, 1946. (625,506.)

21191. Boucher Inventions, Ltd.—Luminescent tube lighting systems. 21st August, 1940. (625,626.)

21213. Glover & Co., Ltd., W. T., and Davey, E. L.—Electric cables. 5th August, 1947. [Cognate Application 16100/48.] (625,512.)

21245. Baldwin, E. F.—High-voltage switches suitable for electric signs. 26th September, 1938. (625,514.)

21354. Steatite & Porcelain Products, Ltd., Woodcock, J., and Paridge, J. K.—Ceramic dielectrics comprising essentially titania. 6th August, 1947. (625,516.)

21577. Westinghouse Electric International Co.—Alternating-current instruments. 22nd August, 1941. (625,524.)

21571. Westinghouse Electric International Co.—Electrical measuring devices. 25th March, 1942. (625,525.)

21577. Westinghouse Electric International Co.—Dynamo-electric machines. 23rd September, 1942. (625,526.)

21765. Western Electric Co., Inc.—Phase modulating apparatus. 20th December, 1941. (625,530.)

21766. Western Electric Co., Inc.—Electromagnetic relays. 11th July, 1940. (625,531.)

21773. Western Electric Co., Inc.—Electrical wave translating systems. 23rd January, 1943. (625,532.)

21774. Western Electric Co., Inc.—Piezo-electric crystal apparatus. 3rd September, 1941. (625,533.)

21778. Western Electric Co., Inc.—Method of and apparatus for assembling insulating rings on a central core. 31st December, 1942. (625,534.)

21790. Winther, M. P.—Eddy current couplings. 26th August, 1946. (625,536.)

21831. Westinghouse Electric International Co.—Metal to glass seals. 2nd November, 1943. (625,540.)

21857. Westinghouse Brake & Signal Co., Ltd.—Electrical relays. 21st March, 1942. (625,541.)

22049. British Thomson-Houston Co., Ltd.—Tube end brushing apparatus. 1st August, 1946. (625,548.)

22134. Bendix Aviation Corporation.—Positioning mechanism for radio tuning and the like. 29th May, 1945. (625,553.)

22255. General Electric Co., Ltd., and Willoughby, A. H.—Circuits for operating electric-discharge lamps. 11th August, 1947. (625,558.)

22294. Ceag, Ltd., and Plummer, R. J.—Electric battery lamps. 11th August, 1947. (625,561.)

22302. Stenor, Ltd., and Giddings, E. J.—Electric switches particularly for electrically heated vulcanizing devices. 11th August, 1947. (625,630.)

1948

18154. British Thomson-Houston Co., Ltd.—Magnetic recording and reproducing of sound and similar vibrations. 9th January, 1945. [Divided out of 625,485.] (625,563.)

German Electrical Trade

OFFICIAL statistics of the exports of electrical equipment, including machinery, in 1948 from Western Germany have now been issued. Their total value was $8,179,000. The principal groups, together with some of the leading destinations, are shown below. Electrical imports during the year were valued at $5,404,000.

Class	$000
Lighting and ignition equipment for motor vehicles, etc.:	107
To Sweden	33
,, Switzerland	27
Dynamos, motors, convertors, etc., up to 10 kg.:	364
To Norway	124
,, Sweden	98
,, Belgium	51
Ditto, 10.25 kg.:	118
To Holland	57
,, Sweden	38
Ditto, over 25 kg.:	242
To Great Britain... ...	45
,, Holland	20
Cable	232
To Denmark	27
,, Saar	21
,, Norway	18
,, Austria	81
,, Sweden	76
Telegraph material	80
To Belgium	17
,, Gt. Britain	20
,, Norway	21
Telephone material	142
To Belgium and Luxemburg...	51
,, Holland	29
,, Norway	29
Radio apparatus	172
To Belgium	26
,, Saar	20
,, Holland	32
,, Switzerland	46
Measuring and indicating Instruments	646
To Belgium	73
,, Finland	92
,, Holland	122
,, Sweden	198
Heating and Cooking apparatus	190
To Belgium	56
,, Greece...	47
Magnetos and other electrical equipment for vehicles ...	938
To Belgium	90
,, Holland	423
,, Sweden	80
,, Switzerland	281
Electrical apparatus for lighting, power, electrolysis, etc....	2,591
To Belgium	249
,, Luxemburg	91
,, Denmark	67
,, Finland	119
,, Holland	984
,, Norway	112
,, Austria	102
,, Sweden	168
,, Switzerland	324
Electric medical and dental apparatus	637
To Holland	153
,, Sweden	109
,, Switzerland	61
,, Uruguay	59

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—BRISBANE.—5th August. City Electricity Department. H.v. a.c. testing equipment and sphere gap voltmeter. (CRE. (IB). 19013/49. Ten/503).*

Belfast.—5th August. Electricity Department. Fire-resisting doors and steel doors. (15th July.)

9th August. Ministry of Commerce. Electrical installation in a new factory extension at Falls Foundry. (See this issue.)

Cumberland.—County Council. Installation of electric wiring at Meadow View House, Whitehaven. County architect, 15, Portland Square, Carlisle.

Dagenham.—8th August. Corporation. Street lighting installation on the Heath Park estate. (See this issue.)

India.—MADRAS.—14th September. Department of Electricity. One 10,000 kW turbo-alternator, boilers, transformer and switchgear for Madura Thermal Scheme. (C.R.E. I.B.) 18760/49. Ten/491.)*

Manchester.—Education Committee. Additions to the electrical installation at Royal Oak School, Wythenshawe. (See this issue.)

Newcastle-on-Tyne.—Education Committee. Installation of fluorescent lighting in the blind workshops of Whickham View. City estate and property surveyor, Town Hall.

New Zealand.—WELLINGTON.—1st November. State Hydro-Electric Department. 66 kV outdoor switchgear. (CRE. (IB). 19335/49. Ten/504).*

North Riding.—Education Committee. Electrical installation at New County Primary School, Newby Scalby, near Scarborough. W. Tocher, architect, 8, Blenheim Terrace, Leeds, 2.

Seaton Valley (Northumberland).—U.D.C. Electrical installations in 38 houses at Seghill. Surveyor, Council Offices, Seaton Delaval.

Southampton.—18th August. Corporation. Electrical installations in flats and houses on Harefield and Millbrook estates. (See this issue.)

Stafford.—Corporation. 13th August. Street lighting electrical equipment. (See this issue.)

Sunderland.—Area Hospital Management Committee. Wiring for electric lighting of Boldon Isolation Hospital. Plans by G. A. Hunter, hospital engineer, Eye Infirmary.

* Specifications may be inspected at the Commercial Relations and Exports Department, Thames House North, Millbank, S.W.1.

Orders Placed

Consett.—U.D.C. Provision of twenty-two electric street lamps from Consett to Blackhill (£550).—B. L. Oliver, Birtley.

Durham.—County Education Committee. Electrical installations in schools.—Ford County School Domestic Subjects Centre (£103).—J. W. Gibson. Hartlepool Church Close County School (£713), Jarrow Monkton County School (£923) and Sherburn Hill County Boys' School (£811). —North of England Engg. & Electrical Co.

Gillingham (Kent).—Corporation. Electrical installations in a further 50 houses.—Lauray Electrical Co.

London.—L.C.C. St. Paul's C. of E. School, Bow, lighting and heating installation.—Lauray Electrical Co.

Whitley Bay.—U.D.C. Electrical installations in 22 houses.—C. N. Whitfield, Monkseaton.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ashbourne.—Houses (41) in six parishes; H. Litchfield, surveyor, R.D.C. Offices, Ashbourne, Derbys.

Ashton-in-Makerfield.—Houses (42) and 8 flats, Bryn Station housing site; U.D.C. surveyor.

Ashton-under-Lyne.—Houses (106), Crowhill; Bower Moffatt & Co., Ltd., Park Street, Manchester.

Barnstaple.—Scheme for civic hall (£100,000); borough surveyor.

Belfast.—Factory extensions (£150,000); Ulster Spinning Co., Ltd., 52, Donegall Place.

Birkenhead. — Houses (60), Woodchurch estate, and flats and maisonettes (42), St. James' Gardens; Lloyd & Cross, Ltd., 68, Argyle Street, Birkenhead.

Blyth.—Conversion of Beulah House into maternity unit for Newcastle Hospital Board; J. W. Hanson & Sons, architects, 123, Northumberland Street, Newcastle-on-Tyne.

Bolton.—Houses (21) off Red Lane and bungalows (20), Watermillock; borough surveyor.

Bournemouth.—Houses (125), Kinson estate; Cooper & Rowe, Ltd.

Brighton.—Factory (£35,000); Lacourbat, Ltd., 189, Upper Thames Street, London, E.C.

Chesterfield.—Houses (44) for R.D.C.; B. Wikeley, engineer, Saltergate.

Houses (56), Lancaster Road site, for T.C.; W. Revill & Sons, 155, Boythorpe Road, builders.

Dover.—Primary school, Astor Avenue, for E.C.; A. W. Kenyon, architect, 15, Adeline Place, London, W.C.1.

Dudley.—Houses (316), Old Farm Park, Coseley; Bridgwater & Shepherd, architects to T.C., 42, Bruton Place, Berkeley Square, London, W.1.

Enfield.—Houses (30), Cedar Road; Townsend & Collins, 2, Brick Lane, Enfield Highway.

Felling-on-Tyne.—Bottling factory for Tower & Co.; Wilson (Engineers), Ltd., builders, 44, Dean Street, Newcastle-on-Tyne.

Friern Barnet.—Flats (30), Colney Hatch Lane, for U.D.C.; Gorham (Contractors), Ltd., 40, North Row, W.1.

Hampstead.—Dwellings (80), West End Lane, N.W.6; E. Glanfield, architect to T.C., 6, Raymond Buildings, Gray's Inn, W.C.1.

Hartlepool.—Houses (1,177) on site north of Hart Road; R. H. Snowball, borough engineer.

Heckmondwike.—Houses (30); J. R. Broomhead, surveyor to U.D.C.

Ilford.—Houses (14), Wanstead Park Road; Lowings & Greenaway, Highland Estate Office, 459, Wanstead Park Road, Ilford.

Houses (20), Burslem Avenue, Stoke Avenue and Newcastle Avenue site; Daniel T. Jackson, Ltd., Westbury Road, Barking.

Ilkley.—Houses (40); U.D.C. surveyor, Town Hall.

Jarrow.—Block of 84 flats, Albion Street; H. W. T. Perkins, borough engineer.

Leicester.—Junior schools, Mayflower Road (£81,467) and New Parks House (£100,469); city architect.

Lincoln.—School canteens at St. Peter-at-Gowts Church primary, Westgate county primary, Spring Hill county modern secondary and St. Martin's Church primary schools; city architect.

Liverpool.—Flats:—Waverley Road (£67,346) and Linnet Lane (£42,305); McNee & Partners, 229, Balham High Road, London, S.W.17. Park Lane (£114,864), Grampion Road (£46,859), Byles Street (£148,742) and Knotty Ash estate (£15,768); C. J. Doyle & Sons, Cathedral site, Mount Pleasant, Liverpool. Holland Street (£70,588); F. C. Bloomfield & Co., 71, Almonde Green, Liverpool, 12. Speke estate (£448,560); Unit Construction Co., Bentham Drive, Liverpool, 16. Devonshire Place (£34,552); Cregorn & Sons, Longmore Grove, Aintree.

Llandudno.—Houses (52), Ire Creuddyn housing site; U.D.C. surveyor.

Lostwithiel.—Farm institute, Ethy Barton (£90,000); S. Gregson, county architect, County Hall, Truro.

Loughborough.—Further 30 houses, Shelthorpe; borough architect.

Lunesdale.—Houses (12), Hornby site; H. Wright, Captains Row, Skerton, Lancaster.

Manchester.—Shops, maisonettes and garages, Baguley Hall, Newall Green, Woodhouse Park and Moss Nook areas; city architect, Town Hall.

Morley.—Houses (74), in three sections; M. H. Brook, housing director, National Provincial Bank Chambers, Queen Street.

Newcastle-under-Lyme.—Houses (24) and six maisonettes; J. Jones, Ltd., Liverpool Road, Newcastle, Staffs.

Newcastle-on-Tyne.—Proposed Hilton primary school; city architect (education section), 31, Northumberland Road.

Newton Abbot.—Houses (108), Buckland estate; C. Bryant & Sons, Ltd., 65, Whitmore Road, Birmingham.

Northolt.—Modern school and grammar school; Middlesex county architect; Guildhall, Westminster, S.W.1.

Norwich.—Houses (56); W. F. Pointer & Sons, Ltd., 86, Hothback Street.

Nottingham.—Primary school, Trowell Road, Wollaton; R. M. Finch, city engineer, Guildhall.

Oldham.—Central laundry adjoining Glodwick Baths; A. L. Hobson, borough engineer.

Padiham.—Houses (36), Slade Lane estate; borough surveyor.

Prudhoe.—Houses (20) for U.D.C.; Havery, Ltd., Milburn House, Newcastle.

Sheffield.—Bus garage with engineering workshops, Herries Road; H. G. Cousins, architect to Transport Committee, 114, Westwood Park, Forest Hill, London, S.E.23.

Smethwick. — Shops, flats, hall, etc.; Montague Burton, Ltd., Hudson Road Mill, Leeds, 9.

Southampton.—Houses (162), Harefield and Millbrook; town clerk, Civic Centre.

South Shields.—Houses (32), Prince Edward Road East; J. Prentice, builder, Leeds Street, Sunderland.

Spenborough.—Houses (30) for U.D.C.; W. Pearson, Eccleshill, Bradford.

Stratford-on-Avon.—Houses (20), Clopton housing site; Stratford-on-Avon Builders, Ltd., 2, Loxley Road.

Sunderland.—Factory, Pallion estate, for Henderson Bros. & Co., London; H. E. Pitt, Ltd., builders, Millfield.

Tynemouth.—Cinema, Waterville Road, for Ridges Estates, Ltd.; W. Stockdale, architect, 73, Howard Street, North Shields.

Wallsend.—Houses (174) for the T.C. Builders: J. E. Gardner, Ltd., St. Cuthbert's Road, Gateshead (98 houses); J. H. James, Archer Street, Wallsend (42 houses); and J. Armstrong, Kenton Road, Gosforth (34 houses).

Warrington. — Adaptation of Causeway premises as transport depot (£12,195); J. Hughes, borough engineer.

Wednesbury.—Houses (84) and 14 bungalows, Hyde Road Golf Links estate; Arthur Booth, borough architect, Town Hall.

Wellington.—Houses (20), High Ercall; J. Brian Cooper, Corporation Street, Birmingham.

West Bromwich.—Factory for Herbert J. Roberts (Confectionery), Ltd., Walsall Road; C. E. M. Fillmore, 8, Newhall Street, Birmingham, 3.

Wimbledon.—Flats, Pelham Road; borough surveyor, Town Hall, Wimbledon, S.W.19.

Whitley Bay.—Houses, Seatonville, for the U.D.C. Builders: F. Hall, Cullercoats (12), and Castles, Ltd., Whitley Bay (10).

Wolverhampton.—Houses (50), Underhill Lane, Cannock Road; director of housing, Town Hall.

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month of 13th July:—

DOOROD.—No. B673,191. Class 9. Radio and television aerials. Belling & Lee, Ltd., Cambridge Arterial Road, Enfield, Middx.

KAYLENE BRAND (design), No. 673,227, and KAYLOMETER, No. 673,229. Class 9.—Electrical apparatus and instruments included in Class 9; scientific and measuring apparatus and instruments; and parts of all such goods included in Class 9. Kaylene, Ltd., Waterloo Road, London, N.W.2.

VISIO.—No. 676,193. Class 9. Television aerials. J. & S. Newman, Ltd., 10, Museum Street, London, W.C.1.

FLUORELUME.—No. 671,448. Class 11. Electric light fittings. The Merchant Adventurers of London, Ltd., 43, Portland Road, London, W.11.